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## COMMUNICATIONS

### PENETRATING WAR WOUNDS OF THE EYE AND ORBIT*

BY

Major H. H. SKEOCH, R.A.M.C.

FROM Sicily into Italy and onwards during many months as the terrain and nature of the fighting changed so to some extent has the type of wound and the surgical problem involved, although fairly constant throughout.

*Types of wound.*—Military ophthalmic surgery is at present chiefly concerned with penetrating wounds due to high velocity fragment missiles resulting from high explosive action, the cause of 99 per cent. of battle casualties and accidents necessitating operation by the military ophthalmic surgeon. The other odd 1 per cent. of wounds are due to flying steel chips resulting from striking cold steel with a steel hammer, the commonest cause of intra-ocular foreign bodies in civil life. This type of injury is similar to a single high explosive fragment wound and presents an identical problem for investigation and treatment.

On the other hand war wounds of the eye and orbit due to high explosive action are often multiple, with additional wounds of the head, face, nose and ears, which suggests co-operative surgery by head, maxillo-facial, E.N.T. and ophthalmic surgeons.

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It is the rule for wounds due to explosion of shells, mortar bombs and grenades to result from iron containing, *i.e.*, magnetisable fragments. But this should not be taken for granted because it is found that accompanying the iron fragments there are often other kinds of foreign body such as gravel or fragments of stone. The novice will soon be disillusioned who lightly presumes that because one wound is caused by a magnetisable fragment a near neighbouring wound contains a similar fragment.

Aluminium grenades have caused a percentage of serious eye wounds because the fragments being radio-translucent and non-magnetic are only sometimes removable even when they can be seen inside the eye. Alloys of aluminium as well as of other kinds of metal have also been found as penetrating fragments. These foreign bodies give a shadow in X-ray films but are non-magnetic and just as difficult to remove. Removal of such non-magnetic foreign bodies with forceps was successfully accomplished in comparatively few cases, but as the alternative is usually total loss of vision any reasonable attempt is justified.

Quite a variety of German mines have been encountered in successive stages of the campaign. At one time most of the mines were iron encased, whatever the nature otherwise of their contents, and magnetisable penetrating fragments were then the rule. At other times the H.E. agent was encased in wood or merely buried in the ground or amongst rocks, thus the resulting penetrating missiles, other than iron, included gravel, sand or dirt, wood, stone or lead fragments, etc., but fortunately never all together in the same face.

Another less frequent type of wound was due to a rifle or machine-gun bullet " splash " of metal fragments from the nickel casing or its lead interior, accompanied by projected splinters of iron from a vehicle, glass from a windscreen or stone from a trench parapet; all of which have been seen.

Contusion of the globe is a frequent accompaniment of penetrating fragment wounds and adds to the difficulty of diagnosis and operative treatment. The contusion injury has to be differentiated from that due to the penetrating foreign body but it should never contraindicate operation for removal of a foreign body.

Blast contusion of the globe is commonly seen as a minimal clinical entity characterised by transient lowering of vision, general injection or redness of the eye, an intact cornea and lowering of ocular tension. Recovery is to normal in a few days. But all degrees of contusion injury are common and damage may include commotio retinae, laceration of intra-ocular tissues with intra-ocular haemorrhage, etc., culminating in extensive intra-ocular

disorganisation with loss of vision and perhaps also with multiple perforating wounds, or loss of the eye from rupture of the globe.

*Routine examination and clean-up of Wounds.*—Whenever possible vision should be recorded early. Examination of both eyes should be made with the pupils dilated. Penetrating wounds involving the face, eyelids, eyes and orbits require early investigation to determine the nature of the foreign bodies, their direction of travel and depth of penetration, as well as to assess the initial amount of damage and prevent loss of tissue by elimination of infection. While this investigation and clean-up of wounds is being done as many foreign bodies as possible should be removed. The earlier this is done after injury the better and easier it is. Routine trial with the magnet point is important, especially to wounds in and adjacent to the eyelids and conjunctival tissues, thus tiny iron fragments are often removed which would otherwise cause confusion with an intra-ocular foreign body in the radiograph. But on the other hand, diagnostic trial of a known intra-ocular foreign body with the giant magnet is to be deprecated. When negative it means nothing and when positive it means additional injury has been done to an already damaged eye. Any information thus gained never justifies this risk.

If for any reason operation has to be postponed, such as the more urgent need for evacuation, then the damaged eye should receive such treatment as will render the patient "fit to travel" for a period even up to 48 hours without the need arising for redressing the eye. Experience has shown that injured eyes travel very well if attention is given to certain treatment requirements, such as follows.

*a.* Meticulous clean-up of lids and adjacent skin surface, cutting of lashes, etc., and cleaning of conjunctival sac with saline or preferably proflavine 1/2000 sol.

*b.* Insertion of ca. penicillin-sulphathiozole powder mixture.

*c.* Ung. atropine 2 per cent. when necessary.

*d.* Covering with either vaseline gauze and large gauze-wool pad or the latter alone firmly secured by a long bandage, 4 in. cut in half.

*Radiological examination.*—Whether the wound is single or multiple the objective of this examination is fourfold.

*a.* To locate as precisely as possible any penetrating fragments, whether intra- or extra-ocular, orbital or etc.

*b.* To determine if possible their composition by noting the relative degree of radio-opacity.

*c.* To note any bony injury; fracture and displacements of bone.

*d*. To note any involvement of paranasal air sinuses or intracranial penetration, which will interest the E.N.T. or head surgeon.

Routine radiological examination should be made even if the foreign body can be seen within the eye, not only because one wishes to know its radio-opacity but because another unsuspected fragment may be present and also one gains valuable information from the examination of a radiograph when one already knows where the foreign body is situated in the eye. Precise localisation of an ocular or orbital foreign body being of such importance any extra trouble taken to attain this end is more than justified.

*Equatorial ring method of X-ray localisation.*—After long trial this method has proved its worth and is recommended as a routine.

It is necessary to have three sizes of ring which can be made, by R.E.M.E., from dental stainless steel wire, B.S.W. gauge 30, spot-welded to form rings of 24, 25 and 26 mms. internal diameter. At one spot on the ring the smallest possible bead of lead solder is applied. It will be found that a 25 mm. ring is that most generally used. Insertion of a ring into one or each eye is preferable just prior to radiological examination. A drop of cocaine solution is soothing but is unnecessary. The patient looks down, the ring is slid beneath the upper lid as far as it easily goes into the upper conjunctival fornix, the patient now looks up, and the lower edge of the ring is lifted with forceps over the lower lid margin and laid in the lower fornix. The ring is inserted so that the tiny lead bead on the ring lies in sight just above the caruncle. If the patient now looks fully towards each side in turn it can be readily seen if the ring is or is not a satisfactory equatorial fit.

If too small it rides forwards on the globe and looks too small, if too large it can be seen to lie away from the globe. If replacement is necessary to give a neat equatorial fit the 24 or 26 mm. ring can be used instead. No sutures are necessary, the ring remains in place and causes negligible discomfort or damage even to an injured eye.

Removal of the ring is by a procedure in reverse order to that of insertion. The patient looks up, the ring is lifted with forceps from the lower fornix over the margin of the lower lid, the patient now looks down, and the ring is lightly removed by sliding from beneath the upper lid.

Three routine radiographs are taken, or four if both eyes are involved. The film should be placed as near the injured eye as is possible and the X-rays should be directed through the eye rather than the orbit.

1. A direct lateral view of the head through the eyes with the eyes looking at right angles to the direction of the rays in the

same plane. The ring should appear in the film as a vertical line. This ideal is seldom attained, a narrow oval being the rule; the bead of solder on the ring identifies which is this nasal edge and indicates the direction of the rays. The position of the foreign body is noted relative to the ring which encircles the equator of the globe. If it is in the posterior wall of the globe this is usually judged accurately enough by experience without precise measurement.

2. An oblique lateral of one or each orbit with the respective eye turned laterally so as to be at right angles to the direction of the rays. It will be noted that the eye moves twice as much as the ring which only tilts or turns half way, and this must be allowed for when viewing the film. The ring shadow is again usually oval. This film is supplementary or rather confirmatory to the direct lateral view.

3. A direct postero-anterior view with the head tilted only just to throw the petrous shadow below the lower orbital margin, eyes looking in the same direction and plane as the rays are directed. It is not really necessary but each orbit can be filmed separately for greater accuracy. The ring appears as a circle and any ocular foreign body shadow must be inside it.

It is useful to compare the relative density of the foreign body shadow with that of the ring and its lead bead. It is an indicator of the nature of the foreign body; *e.g.*, lead fragments resemble the denser shadow of the bead, iron may resemble the steel ring depending on the thickness of the foreign body, whereas stone and wood foreign bodies are definitely of lower radio-opacity. Bakelite and aluminium are radio-translucent, whereas glass may give a shadow depending on its composition.

It may be objected that the ring is not strictly equatorial in all positions of the eye because it does not move equally with the eyeball, it only tilts half way in the direction the eye is turned. This is admitted but it does not alter the fact that operaions planned on this radiographic evidence have been consistently satisfactory and confirm one's faith in the employment of the ring method.

As would be expected, extra-ocular and orbital foreign bodies are of more frequent occurrence than intra-ocular but this radiological method accurately localises either relative to the eyeball.

*Operative treatment.*—Without undue delay one should proceed to operation because there is urgency if not emergency.

*Extra-ocular and orbital* foreign bodies are removable from almost any location behind the globe if their size or position indicate that removal is preferable to leaving them where they are. Orbital depths may be reached by incision through the base of either lid keeping to one or other side of either the superior oblique

tendon or the inferior oblique muscle. To avoid injuring ocular muscle nerves exploration should proceed from outside the cone of muscles. Use of the magnet point may be a help in final identification of iron foreign bodies hidden in muscle or orbital fatty tissues.

*Intra-ocular* foreign bodies irrespective of their composition must first be localised within the globe. The metal fragment may be seen by the ophthalmoscope, and usually the earlier the eye is examined after injury the greater is this possibility; or its site may have to be judged by deduction from clinical and radiological evidence. Few ophthalmic surgeons have a giant magnet at their disposal, but most in this theatre of war have a small "hand" electro-magnet. Possession of a giant magnet permits either of two alternative operative methods, therefore the surgeon's choice of procedure may be limited by lack of it.

*Removal per anterior route.*—By the action of the giant magnet the foreign body is drawn forwards either through a previously damaged lens or around and between an intact lens and fully dilated iris into the anterior chamber from which it is then removed either through the corneal wound of entry or through a fresh keratome section of the cornea. To permit of this manoeuvre without damaging an intact lens or iris a well filled anterior chamber is essential, and the use of a hand electro-magnet advisable.

As a magnetisable foreign body always comes out obligingly with its long axis to the magnet point only very slight enlargement of the entry wound may be necessary.

*Removal per posterior route.*—This method is perhaps most often employed and is to be recommended because it permits:

*a*. The use of the small electro-magnet.

*b*. The nearest and most effective approach of the magnet point to the foreign body and, therefore, the shortest and most direct line for its removal.

The one objection is that this method requires making an incision through the retina unless extraction of the foreign body is accomplished through the scleral entry wound.

1. If the foreign body is judged to be more or less free inside the globe, *i.e.*, not firmly embedded in the scleral wall of the eye, it is advisable to make the posterior sclerotomy opening in the nearest radius by a stab incision of 3 mms. made with the point of a Graefe knife vertically inserted through the whole wall of the globe into the vitreous, inserting the knife point at approximately 7 to 8 mms. posterior to the limbus and cutting forwards 3 mms. towards it. This procedure has not, as might be thought, been followed by intra-ocular haemorrhage. The conical magnet point

is inserted about 2 mm. into the opening to withdraw the foreign body.

2. If the foreign body is seen or thought to be more or less firmly fixed in the posterior wall of the globe, it is preferable to make a similar 3 mm. stab incision as near as possible to the foreign body and in a line parallel to but avoiding the larger retinal blood vessels likely to be damaged. Posterior stab sclerotomies of this type have been observed during the healing process up to eight weeks after operation and no sign of retinal detachment was then seen, but if a diathermy machine is available it is advisable to diathermy lightly the involved area of scleral surface before making the incision to minimise the possibility of retinal detachment.

The small electro-magnet used with success in this theatre of war is a composite gadget made from spare parts by R.E.M.E. at the request of the Adviser in Ophthalmology, Lt.-Col. B. W. Rycroft, A.F.H.Q., under the directive eye of Capt. Edward Livingstone, R.A.M.C.

It is small, the size of a 50 cigarette tin cylinder, composed of a solenoid coil of approximately 1 ohm resistance around a soft steel core, with a conical or alternative screw-on points, and combined end button switch.

The Livingstone-Mansfield intra-ocular hand electro-magnet. Initial model 1.

The Livingstone-Mansfield intra-ocular hand electro-magnet. Later model 2.

It is activated by a 12-volt battery giving 12 amperes current which creates a 4 lb. pull on the end of the magnet core.

No attempt is made to use statistics and the following quoted figures are merely interesting. During the last six months battle and accident casualties have been personally dealt with to the number of roughly 600 cases; of these approximately 300 were probable cases of intra-ocular foreign body and had radiological examination done resulting in 50 per cent. negative and 50 per cent. positive films. Of these latter 150 cases only 50 had successful operations for removal of the intra-ocular foreign body. Many eyes were lost for a variety of reasons, infection being negligible. Perhaps the commonest reason was that the particular eye was too badly damaged to survive without undue risk, another reason being that the foreign bodies were non-magnetic. Included were two cases of siderosis with loss of vision, each resulting from several months retention of an iron foreign body, removed in either case. There was no evidence of sympathetic ophthalmia in either of these cases, nor has it been seen in any others.

*In conclusion,* the purpose of this paper is:

1. To recommend the equatorial ring method for radiological investigation and localisation of all orbital and ocular foreign bodies.

2. To plead for the more confident use of the smaller "hand" electro-magnet which, if properly designed, may with advantage replace the giant magnet.

3. To convey some impressions resulting from recent activity in a busy centre of ophthalmic war surgery.

## HYSTERIA IN OPHTHALMOLOGY*

### Experiences with New Zealand Troops in the Middle East

BY

HOWARD COVERDALE, Lieut.-Col. N.Z.M.C.

THE writer was ophthalmologist at the New Zealand Hospital at Helwan, Egypt, for three years from the end of March, 1941. This hospital served New Zealand Base and to it were referred the great majority of New Zealand ophthalmic sick or wounded as direct admissions, as transfers for treatment or disposal, or as out-patients for investigation.

It may reasonably be assumed that, with the exception of any

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there may have been amongst the 4,139 lost as prisoners of war in Greece and Crete, the number given below represents almost all the cases of hysteria with ocular symptoms diagnosed from amongst the 58,927 troops which constituted the New Zealand Expeditionary Force to Middle East up to the end of November, 1943.

Only New Zealanders are included in this enquiry, although, at Helwan, during the period taken, about a third of the ophthalmic patients were from British Units. While the incidence seemed to be about the same, any comparison between the two groups would, for various reasons, have neither value nor interest.

The diagnosis of hysteria in ophthalmology is facilitated if the term is limited to those cases of psychoneurosis with an incapacitating loss of function, the intensity of other symptoms and signs being regarded as subsidiary. This has been the aim here, and, while it may seem presumptuous to tabulate and count cases of such an ill-defined disorder, yet, in practice, it is seldom difficult to decide, at least to one's own satisfaction, when the diagnosis should or should not be made. It is more difficult, in mild cases, to assess the future usefulness of the man as a soldier.

In Egypt, the demands on the ophthalmologist's energy and time were always so great that, even had he the knowledge and psychiatric experience, he could do no more than make the diagnosis, give an emphatic reassurance and complete the formalities for disposal. No attempt, therefore, is made here to trespass into psychiatry, and any comments are made with diffidence. It may be said, however, that, as in civil life, the average hysteric is an obsessed, humourless type of man, incapable of responding to explanation, reason or reassurance.

Up to the end of 1943, 95 cases were diagnosed, 50 of which were considered severe and 45 mild. The average age was 30 years.

Of the 95, 62 had not been in action with the Division. While the remaining 33 had been with the Division in the field, though not necessarily in action in the face of the enemy, very few had been sent back to Base because the disability had occurred during combat. The majority had paraded sick and been diagnosed soon after their arrival in Egypt.

The highest incidence occurred during and immediately after the Campaign in Greece and Crete when 32 cases were diagnosed, 24 from Base and 8 from the Division. Of those from Base, 15 had just arrived in Egypt. It is possible that colourful accounts of Germany's air superiority had some effect on the morale of the hysteria-prone in Egypt. Thereafter, there were only two periods when the incidence rose above negligible figures; during the second battle of Libya in October, November and December of

1941 (17 cases) and during the intermittent but desperate actions from July to October of 1942 at Minqua Qain and on the El Alamein line (13 cases).

From or during the actions which followed the break-through at Alamein until the German capitulation in Tunisia six and a half months later, there were only 6 cases, 1 from the Division and 5 from Base, 3 of which were from reinforcements just arrived in Egypt.

The most interesting fact to emerge from the clinical examination of these men was that a high proportion had some pre-existing ocular defect dating, in most cases, from childhood.

Amongst the 95 cases, there were 44 with eyes defective at enlistment from squint, old injury, chronic disease, developmental defect or very high degree of refractive error, and 9 with histories of pre-enlistment head or eye injuries, but with no signs remaining.

It may be that such ocular disabilities tend to make men hysteria-prone or, alternatively, that, in those who are hysteria-prone from heredity, environment or other causes, the disability tends to appear in that organ which the man, consciously or unconsciously, believes to be weak.

Early in the war, many major ocular defects escaped the notice of the general practitioners who examined recruits in New Zealand, but, from late in 1942 onwards, a number of mobile optical units with opticians in charge visited all camps in the country, equipped those requiring them with spectacles and referred to ophthalmologists those whose ocular state made it seem unlikely that they would give useful service abroad. Owing to the entry of Japan into the war, no reinforcements arrived in Egypt in 1942, but there is no doubt that, in 1943, this investigation did much to reduce the incidence of hysterical amblyopia.

The following tables give the number of cases in which certain volunteered symptoms were complained of and in which various signs were encountered on examination.

| *Volunteered Symptoms* | *Severe Cases* | *Mild Cases* |
|---|---|---|
| Total number of cases | 50 | 45 |
| Blurred or failing vision | 32 | 36 |
| Headache | 12 | 14 |
| Pain in or behind the eyes | 9 | 8 |
| Anxiety symptoms | 4 | 7 |
| Hemeralopia | 5 | — |
| Flickering or shimmering lights or spots in the vision | 1 | 1 |
| Symptoms due to obsession by after-images | 1 | 1 |
| Blurred vision on fixing the gaze on an object | 1 | 1 |
| Symptoms suggesting contracture of fields | 2 | — |
| Photophobia or intolerance of sun or glare | Numerous | — |

| *Signs on Examination* | | |
|---|---|---|
| Amblyopia ... ... ... ... ... ... | 48 | 44 |
| Contracted fields of vision ... ... ... | 43 | 39 |
| Blepharospasm ... ... ... ... ... | 14 | 7 |
| Signs of anxiety ... ... ... ... ... | 7 | — |
| Defects of accommodation ... ... ... | 2 | 2 |
| Spasmodic squint ... ... ... ... ... | 3 | — |
| Self-inflicted conjunctivitis (presumed) (2 Maoris and 1 mental defective)... ... ... ... | 3 | — |

## Disposal

Forty-two of the 50 severe cases were regraded at the Eye Department for repatriation to New Zealand, and the remaining 8 were regraded to Base. The 45 milder cases were referred back to their Units with reassurances. This difference in disposal was based on a personal opinion of each man's future usefulness as a soldier. Often, there were no reliable criteria for this, but, where there was evidence of pre-enlistment hysteria or where the eyes showed any such defect as congenital cataract or old perforating injury, the case was regarded as severe.

Fifty-three men remained on active service, and the following particulars of their histories, subsequent to their return to their units, have been supplied by Captain G. E. Vercoe, officer in charge of Advanced 2 Echelon, 2 N.Z.E.F.

| | *Number of Men* |
|---|---|
| Repatriated to N.Z. on furlough after serving for about 3 years overseas ... ... ... | 9 |
| Regraded at the Eye Department to Base and still on active service on May 31, 1944 ... | 5 |
| Regraded subsequently elsewhere :— | |
| (1) For repatriation to N.Z. | |
| (*a*) For psychoneurosis... ... ... | 11 |
| (*b*) For various other reasons ... ... | 9 |
| (2) To Base ... ... ... ... ... | 2 |
| Not regraded :— | |
| (*a*) Still with Divisional Units on May 31, 1944 ... ... ... ... ... | 7 |
| (*b*) At Base ... ... ... ... ... | 3 |
| Repatriated to N.Z. without Medical Boarding | 3 |
| Killed in action ... ... ... ... ... | 3 |
| Died (septicaemia) ... ... ... ... | 1 |
| | 53 |

In those cases where, after the diagnosis of hysteria had been made, the men were returned to their units and were subsequently regraded elsewhere for repatriation to New Zealand on account

of psychoneurosis (11 men), the average time which elapsed between the diagnoses at the eye department and the men's departure from Middle East was 9 months. Here, the judgments of future usefulness were mistaken.

In those cases where the men were returned to their Units with reassurances and are still serving as Grade 1 soldiers (10 men), the average time which has elapsed since the diagnosis is 32 months. And for those regraded to Base and still serving (7 men), the average is 25 months. In these two groups and in that which includes the men who were returned to New Zealand on furlough after about 3 years abroad (9 men), opinion, evidently, was sound.

To illustrate the difficulties of assessment, it is of interest, in conclusion, to relate the history of an infantry corporal, aged 24 years, who must have been a man of enduring resolution. He had had an acid burn of the cornea of the left eye in 1938 which had left a nebula sufficient to cause some reduction of visual acuity. In July, 1941, in Egypt, he complained of blurred vision and headache and was found to have hysterical amblyopia in both eyes with the fields of vision reduced almost to fixation. He was still with his battalion when, a year later, he complained of pain in his defective eye. Although the vision had improved, there was still evidence of hysteria. Three months later, he was again referred to the eye department and, as he had some degree of amblyopia and very contracted fields, he was regraded to Base. After a few weeks at Base, he applied to be graded up, but his R.M.O. informed me that he was a nervy, " jittery " soldier and no change was recommended for a further 2 months. At the expiration of this time, in January, 1943, he reappeared, again asking to be allowed to rejoin his battalion at that time in action at Tripoli. As the visual acuity in his sound eye was then normal, his request was reluctantly granted. He was killed in action in Cassino at the end of March, 1944, 2 years and 9 months after the first diagnosis of hysteria.

*Note.*—For permission to publish this paper I wish to thank Brigadier S. Kenrick, C.B.E., D.M.S., 2, N.Z.E.F.

# HETEROPHORIA AND NEUROSIS IN FLYING PERSONNEL*

BY

Squadron Leader H. C. BECCLE, M.D., M.R.C.P., D.P.M.

NEUROPSYCHIATRIC SPECIALIST, R.A.F.V.R. DEPUTY MEDICAL SUPERINTENDENT, SPRINGFIELD MENTAL HOSPITAL

*and*

Squadron Leader E. HOWARD KITCHING, M.D., M.R.C.P., D.P.M.

NEUROPSYCHIATRIC SPECIALIST, R.A.F.V.R.
PSYCHIATRIST, MANCHESTER ROYAL INFIRMARY

HETEROPHORIA, or ocular muscle imbalance, is a condition in which the ocular muscles are not properly co-ordinated, so that the visual axes do not normally lie in alignment. The condition is caused by a relative insufficiency of one or other of the muscles. To compensate for this, the weak muscle has to supplement its normal tone by a continuous active contraction. From this constant activity is said to ensue " a liability to fatigue, and eye-strain, which depending on the constitution and nervous condition of the individual, may protrude itself into consciousness and produce symptoms " (Duke-Elder).[1] The symptoms given are blurring of vision and reflex disturbances, such as headaches and giddiness, and eccentric poses of the head.

A survey of ophthalmological opinion on the subject brings out several points of interest to psychiatrists. The condition is usually regarded as inherent or acquired, the acquired cases being in the majority. It is with the latter group only that we are concerned, and to which we refer when speaking of heterophoria. Among the organic causes are given errors of refraction and organic disturbances of innervation. When these have been excluded, there remain many cases for which no adequate organic cause can be found. These cases then represent a functional disturbance in the true sense, an abnormality of muscular co-ordination in the absence of a structural lesion in the muscles, nerves or central nervous system.

This point alone gives grounds for suspecting a psychological factor, and the suspicion is confirmed in many writings. Duke-Elder states that the condition may be the result of illness, general weakness, anaemia, or " nervous debility." When vitality is good there are usually no symptoms. Fatigue or overwork may promote the appearance of symptoms, which subside or disappear as a result of a rest or a holiday. Speaking of treatment, the

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same author stresses that orthophoria is rare, that most heterophoria is minor in degree, is symptomless and requires no treatment. Apart from correcting errors of refraction the general health requires treatment rather than the heterophoria, because "the lack of equipoise is frequently less the expression of a local defect than of a general neurosis." This latter should therefore be treated. In normal civilian practice minor degrees of heterophoria are common and not associated with symptoms. (Duke-Elder, Parsons[2] *et al.*)

Livingston[3] quotes figures to show that with certain occupational exceptions, significant evidence of heterophoria is found in only 1·3 per cent. of routine ocular examinations. This, however, is not in conformity with the observations of other authorities. The presence of symptom-free heterophoria of considerable degree is shown by the work of Grieve and Archibald.[4] They examined 7,019 healthy men of military age, and 375 or 5·3 per cent. showed deviations of more than four prism dioptres laterally, or 1·5 prism dioptres vertically. Of these 375, only 1·3 per cent. complained of symptoms. The presence of a prominent psychological factor in this type of case is emphasised, and work by other investigators to the same effect, notably that of Mann,[5] is quoted. Dealing with the relationship between heterophoria and aviators, Livingston notes many cases where the response to tests falls well outside the standards laid down, yet who are steady and successful pilots. This author refers to many of these cases of acquired heterophoria as "ill anchored psychic vessels," and adds that "the first indication of cerebral unrest is due to the increasing subconscious effort needed to retain and maintain binocular harmony." Parsons regards heterophoria as a frequent cause of bad landings, and stresses the part played by fatigue and strain in the symptom complex. De Schweinitz[6] gives a comprehensive list of causes, including anaemia, lack of tone, nervous exhaustion, gout and so forth. In the syndrome he enumerates muscular weakness, variable blurring of vision, blepharospasm, photophobia, eccentric poses of the head, headaches and a reflex neurosis. Chavasse[7] includes among the list of central obstacles to binocular vision hysteria, malingering, undue nervous excitability and indocility, either congenital or acquired. Mary Pugh[8] contends that there is no longer any doubt that many squints, latent and manifest, are of psychological origin. She adds that local treatment in these poorly adapted people may lead to the establishment of other neurotic foci. In this connection Livingston describes an interesting case of a pilot who received successful orthoptic treatment for an esophoria which adversely affected his landings. As the esophoria cleared up and a return to duty became imminent, he developed gastric symptoms which were

found to be related to a flying phobia, an indication of his tendency to convert anxiety into somatic symptoms.

The inconstant and variable relationship between symptoms and objective findings in heterophoria is stressed by Michaelson[9] who noted that ocular muscle imbalance may exist for years without symptoms. These are often precipitated by emotional stress. He insists that a general idea of the personality pattern of each patient should be obtained in studying these cases.

The functional nature of the condition, the variable presence of symptoms, the inconstant relationship between symptoms and signs, the presence of associated nervous symptoms and indications of emotional instability, all suggest the existence of important psychological factors in heterophoria, calling for investigation.

With this end in view 57 successive cases of heterophoria in flying personnel were subjected to investigation by the usual means of a comprehensive interview and examination. All were cases presenting with eye symptoms and in whom heterophoria was discovered in examination by the ophthalmologist, using the standard tests, notably the Maddox rod.

Of the 57 cases examined, we found that 50 were suffering from definite well marked psychological illnesses. In 48 this illness was either an anxiety hysteria or hysteria. One was a case of severe depression, and one was a psychopathic personality. In 7 cases we could find no evidence of significant psychoneurotic abnormality associated with heterophoria. In the 50 cases which we found to be psychologically ill, we came to the conclusion that the heterophoria, though often the most prominent presenting symptom, was only one manifestation of a generalised psychological illness, which was itself the main and primary disability. The diagnostic categories are set out in Table I.

TABLE I

| Diagnosis | No. | Percentage of Total (57 Cases) |
|---|---|---|
| Anxiety hysteria ... ... | 40 | 70 per cent. |
| Hysteria ... ... ... | 8 | 14 per cent. |
| Depression ... ... | 1 | 2 per cent. |
| Psychopathic personality | 1 | 2 per cent. |
| No significant abnormality | 7 | 12 per cent. |

Table II shows the presenting symptoms for which help was sought. It will be seen that in 56 cases the presenting symptom was an ocular one. The solitary exception was a patient whose initial complaint was of giddiness.

TABLE II

| Presenting Symptom | Number of Cases |
|---|---|
| Faulty landings | 24 |
| Eye strain | 16 |
| Blurred vision | 5 |
| Night blindness | 4 |
| Diplopia | 2 |
| Deteriorating vision | 1 |
| Difficulty in seeing instrument panel | 1 |
| Tired eyes | 1 |
| Watering eyes | 1 |
| Found during routine examination | 1 |
| Giddiness | 1 |

In the 50 abnormal cases the diagnosis of psychological illness rested on the usual criteria. Associated symptoms characteristic of neurosis were found in all the cases in varying numbers, depending upon the severity of the disorder and its type. They included apprehension, feelings of nervousness, timidity and anxiety, headaches, usually described as " terrific," and showing a characteristic neurotic variability. Other symptoms were sweating before a flight, nightmares, disturbed and unrefreshing sleep, spells of depression, claustrophobia, air-sickness and dizziness.

Palpitation and dyspnoea with easy fatigue and a general sense of malaise and lack of zest were common. Dyspeptic symptoms and grosser hysterical manifestations such as paralyses, amnesia, fugues and sensory disturbances were not encountered.

Evidence of the " neuropathic constitution " or predisposition to nervous disorder, was found in all 50 cases showing abnormality. Personality studies revealed varying numbers and degrees of those traits in early life which are regarded as an indication of an abnormal sense of insecurity, and as forerunners under special circumstances of a more manifest neurotic disease in later life. Restless sleep, nightmares, night terrors and nocturnal enuresis in childhood were repeatedly found. During school life most of the anxiety hysteria group had been timid and unaggressive, had lacked initiative and a sense of adventure. They were easily discouraged and avoided rough games. A fair number

could swim, but practically all avoided diving and disliked it. They revealed excessive visceral responses to ordeals such as examinations, important games or interviews; they had admitted and recognised feelings of personal insecurity and inferiority, lacked confidence in themselves and were unduly dependent on their parents. All of these were encountered frequently. Emotional immaturity was especially common in the hysterical group and was evident on examination.

A family history of definite neurosis in one or both parents was obtained in fifteen cases. Psychosis and alcoholism each occurred once in the family histories. A more familiar story in most cases was that of anxious, worrying and over-solicitous parents, who suffered from such complaints as chronic dyspepsia, back-ache, or hypertension and were frequently under medical care.

In all the cases of neurosis, the exciting cause which precipitated the disorder was a conflict over flying duties. Because of their predisposition to the development of neurotic symptoms these patients showed anxiety in response to the normal hazards of flying, and especially to flying stress, more readily than the non-predisposed. The subject of flying stress is not one for discussion here. It has been comprehensively surveyed by Symonds[10] and the various factors discussed. Our findings have agreed with those of Symonds, in that the more heavily predisposed persons broke down earlier in their flying career and as a result of less stress, than the more stable ones.

Insight into the nature of the trouble varied enormously. In the more intelligent and relatively stable members of the anxiety group, there was usually some awareness of a growing hostility towards flying but without full realisation of the rôle played by this hostility and its conflict with the sense of duty, in the production of the symptoms. In the hysterics the hostility tended to be more deeply repressed, and often was accompanied by conscious protestations of willingness and desire to continue flying.

### Illustrative Cases

Case 1.—Pilot, aged 23 years. Forty operational sorties. Complaint—difficulty in seeing his instrument panel after flying for half an hour, headaches and insomnia. Ocular findings—convergence fatigue, esophoria six prism dioptres. Psychiatric examination—an over anxious worrier, sleepless, "fed up," and much more impressionable than normal. Suffers from much anticipatory dread, reflected in sweating, trembling and epigastric sensations. Similarly affected by the sight of blood. Headaches and insomnia increasing in severity. Very anxious

over flying but with a high sense of duty and much tendency to persevere. Mother a chronic worrier.

Case 2.—Pilot, aged 30 years, with over 300 flying hours in Coastal Command. Complaint—tendency to take off to the left especially at night. Tends to land too high resulting in two accidents. Ocular findings—hyperphoria one prism dioptre. Adduction + 25 per cent.—not steady. Was recommended for a course of eye training, which was cancelled after inspection of psychiatric report. Psychiatric examination—markedly timid and over conscientious person with obsessional trends. Well marked anxious anticipation before flying, motives for which were initially inadequate. Tends to panic in emergencies. Always timid and unaggressive, avoided fights and swimming. Increasingly anxious about flying duties.

Case 3.—Air Bomber aged 29 years, with 70 hours flying in elementary aircraft. Complaint—eyestrain, " bombing going to pieces," and headaches. Ocular findings—marked ocular muscle imbalance, and convergence weakness of left eye. Orthoptic exercises prescribed but discontinued because he said it made him sick. Following this complaint of nausea he was referred for psychiatric opinion. Psychiatric examination—associated symptoms were found, such as " black-outs " and giddy attacks during training overseas, also feelings of fatigue, listlessness and loss of appetite. Could not concentrate. Markedly predisposed to nervous illness. In childhood exhibited fear of the dark, nail biting, thumb-sucking, and stammer during school days. Nausea at the sight of blood, feelings of faintness, food fads and capricious appetite. Gave up swimming because of lack of confidence; never dared to dive. Father always anxious worrier, died of angina. Mother chronically depressed and neurotic. Patient an only child. Extremely timid and anxious personality, containing marked anxiety and hysterical trends.

Case 4.—Air Gunner aged 22 years, with 250 non-operational hours flying. Complaint—headaches and blurred vision. Ocular findings—convergence defect and esophoria. Psychiatric examination—unreliable witness, untruthful, emotionally immature and given to histrionic poses. Eye symptoms were obviously part of a defensive system. Past history included phases of marked moodiness and anxious tension. The conclusion arrived at is that he is a typically hysterical person. Feels unable to continue flying duties because he is incapacitated by his symptoms.

## Conclusions

This series of cases does not attempt to give any idea of the frequency and distribution of heterophoria and neurosis in flying

personnel as a whole. What is submitted is that heterophoria and neurosis frequently co-exist, and that in 50 of our 57 cases, 87 per cent., heterophoria was itself a symptom of hysterical type, and part of a generalised psychological illness, which is the primary and major disorder. References to the literature indicate that this conclusion applies also to the civilian cases. If the conclusion is a valid one and it is established that heterophoria is in the majority of cases a psychiatric symptom, then it has important implications for prognosis and treatment.

It is customary to give these cases orthoptic, *i.e.*, local treatment, as a principal measure. Whether, or when, a neurotic symptom should be treated by local remedies, is a controversial point. There are circumstances which make such a course desirable and correct, and we are far from suggesting that it should not be employed. But it is submitted that in the treatment of neurotic symptoms, local treatment alone is not enough. It should be preceded by a psychiatric examination. This is essential, not only to establish a correct diagnosis, but also to decide on the appropriate treatment for each particular patient, whether by some environmental adjustment, or some form of psychotherapy, in addition to any local treatment that is desirable. Orthoptic treatment alone may cause the heterophoria to disappear. It will not cure the neurosis or render the patient less vulnerable to a recurrence. On the other hand it may confirm a hypochondriacal eye-consciousness, and render ultimate psychological treatment much more difficult. Whether it should be employed or not, and what other measures are desirable, for the treatment of the whole condition should, we think, be decided by collaboration between the ophthalmologist and the psychiatrist. At any rate, it would seem on the evidence presented, that the ultimate prognosis depends more upon the emotional stability of the patient, than upon the degree of ocular muscle imbalance which is present.

## Summary

The relationship between heterophoria and neurosis is discussed and the literature is reviewed.

Fifty-seven cases of heterophoria in flying personnel are presented and the psychiatric findings are discussed. Fifty cases or 87 per cent. were found to have psychological illnesses of well marked type.

The results suggest that a psychological examination is an essential part of the investigations of ocular muscle imbalance. Local treatment should not be started until the presence and degree of psychoneurosis has been assessed.

We wish to acknowledge our indebtedness to Air Commodore R. D. Gillespie and Air Commodore P. C. Livingston for putting at our disposal their case records of a number of these patients.

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## MACULAR COLOBOMA WITH BILATERAL GROUPED PIGMENTATION OF THE RETINA*

BY

IAN S. MCGREGOR

GLASGOW

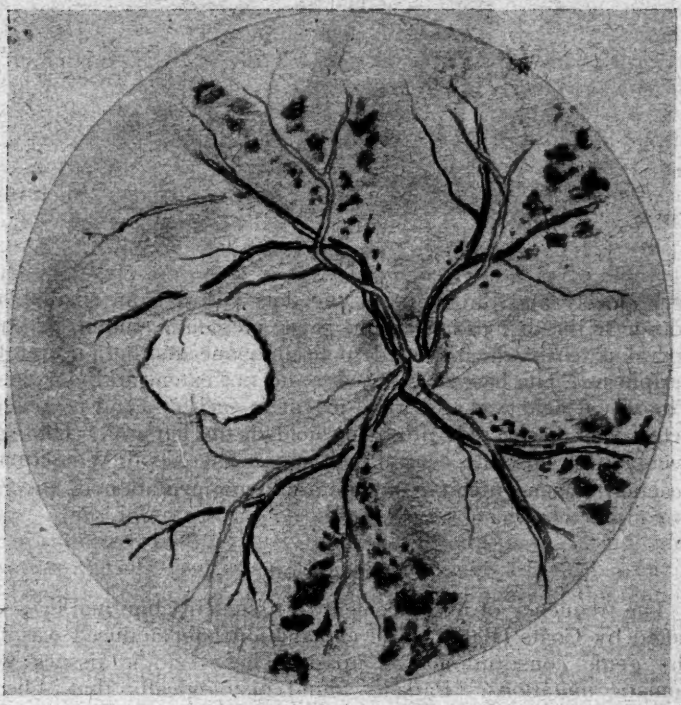
FIVE cases of grouped pigmentation have come under our notice in the past two years. Only one showed a coincident abnormality of the eye. It is the exception to find any lesion that might be considered congenital in the same eye as that showing grouped pigmentation. Blake, in a review of the literature until 1926 found, inferior conus, epicanthus, cataract in the fellow eye, and abnormality of the extra-ocular muscles. In none was there any visual defect. The case we propose to discuss had a macular coloboma in the right eye, and we have not been able to find a similar case in the literature. It was further unusual in the wide bilateral distribution of the pigment spots. These spots are considered to be of congenital origin. It would be legitimate to assume that the coloboma was also congenital, arising out of the same adverse factor. It is often difficult to say whether macular coloboma is congenital or not except in the familial bilateral group with skeletal deformity, or where there is some characteristic like ectasia, abnormal vessels, or coloboma of the disc to support the view. This case probably deserves record because the picture is rare and a brief consideration of the possible aetiology might be of interest.

* Received for publication, July 15, 1944.

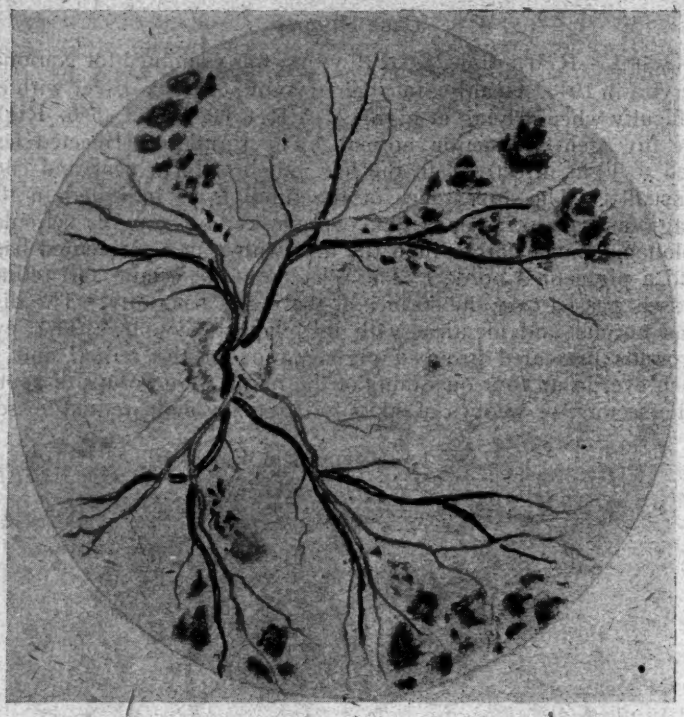
## Case History

CASE 1.—R.M., Male, aged 19 years, was examined for National Service in 1943. Healthy, fair-haired youth. A truck driver with no difficulty when driving at night. V.A.R. 6/60, V.A.L. 6/6. Right eye divergent, refraction normal. The right pupil reacted less well to light directly than the left, but briskly to near and consensually. The appearance of the fundi is as indicated in the diagrams (Fig.). The right eye showed a roughly circular coloboma, much larger than the disc with a non-pigmented base and a pigmented border. The sclera was not ectatic and retinal vessels passed over the surface of the defect smoothly. The disc was normal and identical with its fellow in colour. The eye grounds presented grouped pigmentation of the retina, and in each eye, in all four quadrants of the retina were groups of spots. The sectors, or wedges of spots followed the main retinal vessels

CASE 1.—Diagrams of Fundi.



RIGHT EYE.



LEFT EYE.

very closely and the shape of the dots varied from small black dots near the disc to larger and paler, crescentic, round, or polyhedral patches which tended to fit into one another, nearer the periphery. The base of the wedge did not extend to the equator. The visual field was of normal extent in each eye and no relative defect was discovered within the field in the left eye. The right eye had an absolute central scotoma. The blood Wassermann reaction was negative. No abnormal pigmentation of the iris, or conjunctiva was observed.

## Discussion

The frequency of misplacement of tissues in abnormal eyes was noted by Coats (1909). The explanation later adduced was that the genic constitution was upset. These ectopic tissues were somatic mutations. Parsons found histologically that "bear's paw" spots consisted of intensely pigmented cells and glial-like

tissue, some of the cells having migrated into the retina. But pigment migration is a common feature of retinal pathology. It is the fundus picture that makes us think the condition is of prenatal origin. Nothing like it arises out of an observed post-natal retinal disease process. Most authors agree that the spots do not change throughout life. They are larger and paler near the equator and the group of spots is consistently wedge shaped with the apex near the posterior pole. These facts would be explained if the globe expanded most at the equator during the last weeks of gestation. Miss Mann has been good enough to inform us in correspondence that she considers that this is the case. So that, given a group of spots near the posterior pole in the sixth month they might acquire the character and distribution of grouped pigmentation by term on a simple mensuration basis.

It is clear from the evidence of experiment in tissue culture that varied environmental conditions may produce the same type of derangement provided the disturbance factor is active at the same stage in development. The time is important as well as the agent. Sporadic congenital macular coloboma, or dysplasia may be regarded as a developmental failure or as the result of foetal inflammation. Miss Mann considers that the facts are best explained on the inflammatory concept. She further states that the characters of the coloboma may denote the time of origin of the lesion; coloboma with abnormal vessels occurring at the time when the vitreous is full of vessels in the 3rd month, non-pigmented coloboma with ectasia occurring at the 6th month, and pigmented coloboma in the later months. The last is nearest to the adult disease pattern. Any environmental adverse factor, inflammatory, hormonal or physical acting in the early months to produce defect, results in gross deformities which are roughly similar in plan but have no resemblance to the aspects of adult disease. Late foetal choroiditis may be indistinguishable, microscopically and histologically from adult choroiditis. In the foetus the macula suffers more readily because it is at the top of the axial gradient after the closure of the optic cup. In this connection the papers of Vail, Koch, Wolf, Cowan and Paige and others in central choroiditis of infants infected by toxoplasma are interesting. Many infants of the observed series were considered to have been infected in the later weeks of gestation. Complement fixation and toxicity tests for toxoplasma gave a large percentage of positive findings in affected children, and many of the mothers were also positive (Sabin, Sabin and Buchman, Warren and Sabin). Vail says, " It is significant that in nine out of ten cases in which the sera contained neutralising bodies for toxoplasma the only clinical manifestation was that of a chorio-retinitis of unknown etiology with a predilection for the macular region."

So that we may regard our case as a developmental, or inherent fault, showing arrest and aberration; macular arrest and abnormal development of pigment as a somatic mutation. We know little of the laws that govern mutation. Experimentally the gene constitution can be altered by X-rays in Drosophila to produce white facets in the eyes of an insect which would otherwise be uniformly red. The toxins of disease may on occasion be the initiators of somatic mutations in actively differentiating tissues. Alternatively, one may simply regard this case as a foetal choroiditis, having the main characters of any patch of old choroiditis, namely, atrophy at the centre of the lesion and pigment proliferation at the periphery, the pattern of the peripheral pigmentation being subsequently altered by growth of the globe. The grouped pigmentation was unusually well-marked being present in all quadrants of both eyes. It might be suggested that a foetal inflammation had destroyed the macula and given rise to the surrounding pigmentary changes, these changes assuming the characteristics of grouped pigmentation with further growth of the globe.

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# SECONDARY CARCINOMA IN THE ANTERIOR CHAMBER*


BY

A. J. B. GOLDSMITH

FROM THE PATHOLOGICAL DEPARTMENT, MOORFIELDS


SECONDARY carcinomatous deposits within the eye probably occur with greater frequency than the literature would lead one to suppose. Stallard (1933) gave a ratio of 1 :140,000 in the Moorfields records. There is little doubt that if routine examinations were

* Received for publication, August 12, 1944.

made of those dying of generalised metastases, many cases would be found, a point made by Devereux Marshall (1897) who made the first collection, of 24 cases, from the literature. Enough have, however, been recorded for the salient clinical and pathological features to be assessed. Surveys of the sites of the primary growths, and of the regions of the eye affected have been made by Ask (1934) and by Lemoine and McLeod (1936) and the condition has been described and the literature collected by Duke-Elder (1940).

In only one case verified by pathology has the retina alone among the intra-ocular structures been invaded, that reported by Smoleroff and Agatston (1934) in which the primary growth was a gastro-oesophageal carcinoma. Otherwise in all recorded cases intra-ocular metastases have been in the uveal tract, the choroid being by far the most frequently implicated. In the series of histologically proved cases collected by Ask and later added to by Lemoine and McLeod there were 156 of choroidal metastasis. In 8 of these 156, growth was also present in the iris or ciliary body or both, having arisen there either as a result of direct extension forwards from the anterior choroid, or in some cases apparently from separate emboli. In 8 further cases only growth was confined to the anterior part of the uveal tract, the ciliary body, or ciliary body and iris. Involvement of the iris alone is rarer still. The only two examples in which such limitation has been proved by histological examination of the whole eye are those of Proctor and Verhoeff (1907), and Sanders (1938).

This apparent selective affinity for the choroid probably depends on the vascular arrangements, since the malignant cells reach the eye as an embolic process. Of the cases in Ask's, and in Lemoine and McLeod's series in which clinical and pathological data are adequate, metastases in the eyes were bilateral in 13·7 per cent., right sided in 40·5 per cent., and in the left eye in 45·8 per cent. Thus as in cerebral and retinal embolism, and for the same reason, the left side is slightly more often involved than the right, and the anatomical arrangements and number of vessels favour the travel of emboli along the short posterior, rather than the long posterior or anterior ciliary vessels, thereby determining the higher incidence in the posterior half of the eye. The vascularity of their eventual resting place may also play some part; the area temporal to the disc in which secondary deposits are most often found is the region of the choroid not only with the largest number of afferent vessels, but also with the richest capillary network.

Following the lodgment of the embolus, proliferation of the malignant cells takes place, and after perforation of the blood vessel wall the tumour spreads along the line of least resistance, laterally in the choroid, forming the flattened plaque with rounded

edges giving the characteristic clinical appearance. The extent of spread will depend on the rate of growth, the amount of reactionary fibrous tissue formed, and the period of survival of the patient. Perforation of Bruch's membrane, invasion of the sclera, and extra-ocular extension are rare. A retinal separation may occur at any time, probably as a result of exudate from the choroid. The histology of the deposit depends on the nature of the primary growth. In many cases, particularly those of anaplastic type, it may be difficult or impossible to give a definite opinion as to the primary focus from the appearance of the secondary, but in all cases the tendency is for spread to take place by direct lateral extension.

This case is reported because it shows a condition not hitherto described, the presence of carcinomatous deposits free in the anterior chamber, as well as in the root of the iris, in the ciliary body, choroid and sclera.

The patient, a woman aged 64 years, attended Moorfields in December, 1943, giving a rather vague history of progressive failure of vision in the right eye over a period of about a year. She had seen an ophthalmic surgeon in October, 1943, and had been given miotic drops. When seen at Moorfields the right eye was injected, the cornea was so oedematous that no deeper structures could be clearly seen, the tension was markedly increased, and there was no perception of light. In the left eye the corrected vision was 6/6, and the fundus was normal. She had had a left radical mastectomy for carcinoma (confirmed by histological examination) a year previously, and at the time of ocular examination there were no obvious metastases. The possibility of secondary carcinoma in the eye was considered and she was advised to have it removed. This was done. A letter from her doctor in July, 1944, stated that apart from arterial hypertension and slight symptoms referable thereto, she was well and showed no clinical evidence of recurrence.

The enucleated eye was fixed in Zenker's solution, divided horizontally, embedded in celloidin, and stained with haematoxylin and eosin. Macroscopically it was noted that the lens and retina were *in situ*, and that there was some cupping of the disc, and a little thickening of the choroid on the temporal side. Microscopically the salient feature is the presence of secondary carcinomatous deposits, composed of spheroidal cells showing some variation in size and staining, a few mitotic figures, and no attempt at tubule formation. Deposits are present :—

(*a*) In the choroid. The main mass is on the temporal side where it extends from near the disc as far forwards as the equator (Fig. 1). A few small foci of growth are also present on the nasal side, indicating multiple emboli.

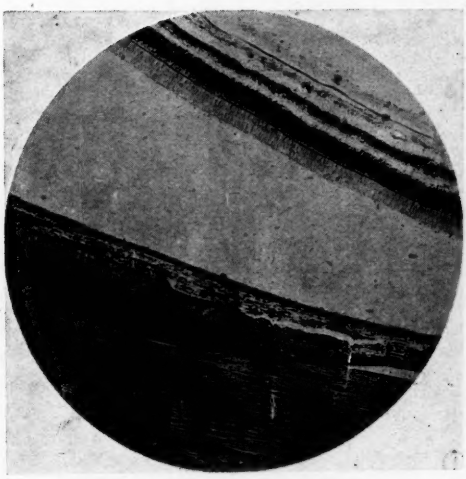

FIG. 1.

Infiltration of the choroid by spheroidal celled carcinoma. The photograph shows the posterior edge of the deposit on the temporal side close to the disc. (×64).

FIG. 2.

Showing one of the ciliary nerves lying in its canal and surrounded by secondary carcinoma. (×64).

FIG 3.

The region of the angle of the anterior chamber, showing deposits of growth in the root of the iris, and proliferation of carcinoma cells in the anterior chamber. (×64).

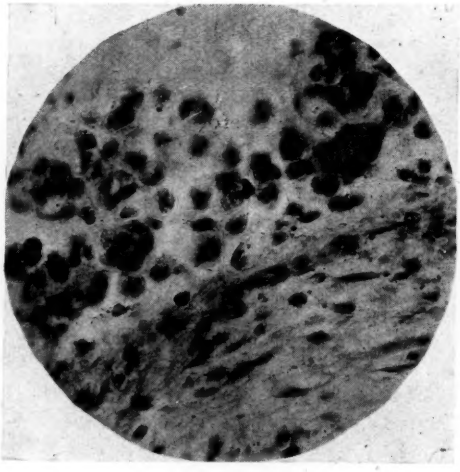

FIG. 4.

Showing part of a nodule lying on the surface of the iris, demonstrating the type of cell, and lack of vascular or connective tissue connection between the iris stroma (below) and the growth. (×360).

(*b*) In the sclera. Here growth is extending along the canal of one of the ciliary nerves close to the disc. In the photomicrograph (Fig. 2) it can be seen surrounding the nerve fibres.

(*c*) In the ciliary body and root of the iris on the temporal side. (Fig. 3.) A small nodule of growth can also be seen in the intermediate portion of the iris.

(*d*) In the anterior chamber. In the angle malignant cells have burst through the iris root and are proliferating into the anterior chamber where they form a plaque lying on the surface of the iris, but not intimately connected with, and deriving no blood supply from it (Fig. 3). A few isolated malignant cells are lying on the posterior surface of the cornea, and, towards the pupillary border of the iris quite large isolated masses of growth are present on the iris surface (Fig. 4). These again derive no connective tissue support, and no blood supply from the iris stroma. Serial sections were cut to ascertain if these apparently isolated masses were part of the head of a " mushroom " growth with its " stalk " rooted in the iris, but such is not the case and the masses are in fact isolated and without visible means of sustenance.

On the nasal side of the anterior chamber (not pictured) there is no growth in the iris root nor in the ciliary body, but there are peripheral anterior synechiae of the iris, and the false angle is filled, and almost the whole of the anterior surface of the iris covered by a thick layer of carcinoma cells, again having no connection with the iris stroma. The amount of growth in the anterior chamber is considerable, and there seems to be no doubt that, once having gained access to it by bursting through the root of the iris, rapid proliferation of the cells took place, and that their nutriment must have been derived from the aqueous fluid. The conditions of growth must therefore have been similar to those obtaining in tissue culture experiments. The isolated nodules towards the pupillary border of the iris may have grown from the terminations of tongue shaped extensions from the main mass in the angle with subsequent disappearance of the connecting bridge. It appears more likely, however, that they have developed from detached malignant cells floating in the aqueous and eventually lodging in the iris crypts.

The remainder of the eye shows no features of particular interest. There is some oedema of the corneal epithelium, corresponding to the clinical observations. The retinal vessels and those of the uveal tract show slight arteriosclerosis (seen in Fig. 3), and the disc is cupped.

## Discussion

The spread of secondary carcinoma in the eye is usually by a process of direct extension between the tissue planes as a result

of the original location of the embolus, and the appearance of proliferation into, and metastasis across the fluid-containing chambers of the eye has not hitherto been described. Such phenomena are common in the case of neuro-epithelial retinal tumours, in which "seedling" deposits of varying size and activity are often seen on the surfaces of the pigment epithelium, the unaffected part of the retina, the ciliary processes, the lens, or in the anterior chamber. The manner of their formation is clear; owing to its situation the retinal tumour must project at an early stage into either the vitreous or inter-retinal space, and malignant cells are easily separated and distributed as in carcinomatosis of the pleura or peritoneum. Cells from this type of growth are readily viable, and able to grow in a culture medium of the intra-ocular fluids, it being by no means unusual to find a clump of them thriving on the posterior surface of the cornea.

Secondary carcinoma does not behave in this way, either because the cells are less viable, or, more probably, because its situation does not usually permit of free access to the spaces containing intra-ocular fluid. That the latter is the true explanation is suggested by the findings in the present case, and in that of Smoleroff and Agatston to which reference has already been made. In their case a metastasis from a gastro-oesophageal carcinoma had caused an extensive retinal separation and the photo-micrographs show, in addition to the main deposit in the retina, small seedlings on the surface of the pigment epithelium. These must have grown from cells detached from the main mass which had floated through the fluid filling the inter-retinal space.

It has been shown in experimental cancer research work that carcinoma can be inoculated into, and will grow in the anterior chamber of the homologous animal (Greene and Saxton, 1938). Heterologous transplants have also been successful, examples being the implant of a human schirrus breast carcinoma (Greene, 1938), and of a human fibrosarcoma (Greene, 1942 *a*), into the anterior chamber of rabbits' eyes. Other interesting, if conflicting work suggests that the blood-aqueous barrier may be impermeable to circulating antibodies, and that the experimental animal may be susceptible to anterior chamber inoculation while being resistant elsewhere (Saphir, Appel and Strauss, 1941. Cheever and Morgan, 1942. Greene, 1942 *b*, and others). As pointed out by Freeman and Zimmerman (1944), and demonstrated by a series of colour photographs of eyes containing implanted brain and other tumours, the anterior chamber is a most favourable site for studying the growth of transplants, the clear cornea allowing of direct observation under magnification.

**Summary**

A hitherto undescribed condition is described, in which secondary carcinoma is growing in the anterior chamber after the manner of a tissue culture.

Attention is drawn to the differences in manner of intra-ocular extension between neuro-epithelial retinal tumours and secondary carcinoma within the eye, and it is suggested that these are largely the result of the different sites in which the two types of growth originate.

Attention is also briefly drawn to the use made in experimental cancer research of the capacity of the aqueous fluid to act as a tissue culture medium.

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## CHOICE OF SULPHONAMIDE IN THE TREATMENT OF OPHTHALMIA NEONATORUM*

BY

ARNOLD SORSBY *and* ELIZABETH E. HOFFA

LONDON

THE value of the oral administration of sulphapyridine in the treatment of ophthalmia neonatorum was established in an earlier communication (Sorsby, Hoffa and Smellie, 1942). In a series of 273 cases clinical cure of the affection was obtained within 8 days in 61·9 per cent. as against cure in 15·2 per cent. in a control series of 46 cases treated by the classical local methods. It was also pointed out that the results were actually better than these figures indicated, for this series contained many cases treated—during the earlier stages of the investigation—with an inadequate dosage. A subsequent communication (Sorsby and Hoffa, 1944) confirmed and extended these findings. In a series of 133 cases treated to a conclusion with sulphapyridine 88·7 per cent. showed clinical cure

* Received for publication, January 5, 1945.

within 8 days, but to achieve these results a dosage cumulatively larger than suggested at first had to be employed. The initial dose of half a tablet (0·25 g.) was followed by a maintenance dose of 0·125 g. four-hourly day and night, and this was maintained for 2 days after apparent clinical cure. Under these conditions it was found that, whilst there were no serious toxic complications ensuing from the use of the drug in such dosage, the babies were not free from toxic symptoms. In fact twenty-three cases showed intolerance to sulphapyridine and another sulphonamide had to be exhibited. Comparative studies with sulphathiazole in 43 cases, sulphadiazine in 31 cases, and sulphamezathine in 28 cases showed that each of these drugs was better tolerated, and gave results of the same order as sulphapyridine. The percentage of cases giving clinical cure within 8 days for each of the four drugs was 88·7, 93·0, 83·9 and 92·9 respectively. Actually a considerable percentage of cases showed clinical cure within 3 days, the percentages being 30·8, 32·5, 32·3 and 39·8 respectively. (In the case of sulphapyridine the percentage of cures within 8 days was reduced to 82·7 per cent. if the cases in which intolerance was shown are included and to 27·0 per cent. of cures within 3 days.)

No further work with sulphapyridine has been undertaken. The material that has accumulated during the past year (January 1-December 31, 1944) consists of 120 cases. One baby suffering from gonococcal ophthalmia died from prematurity on the second day after admission and is excluded from this series. Of the

TABLE I

*Comparative results in 75 cases of Ophthalmia Neonatorum treated with different sulphonamides*

| | Sulphanilamide | | Sulphamezathine | | Sulphathiazole | | Sulphadiazine | |
|---|---|---|---|---|---|---|---|---|
| Clinical Cure | Gonococci positive | Gonococci negative | Gonococci positive | Gonococci negative | Gonococci positive | Gonococci negative | Gonococci positive | Gonococci negative |
| 1—3 days... ... | 1 | 6 | 3 | 19 | — | 1 | — | 1 |
| 4—8 days... ... | — | 3 | 2 | 20 | — | 2 | — | — |
| Relapses ... ... | — | 1 | 1 | 6 | — | — | — | — |
| Poor response ... | — | 1 | 2 | 3 | — | 1 | — | — |
| Drug discontinued because of toxic effects ... ... | — | 2 | — | — | — | — | — | — |
| Totals ... ... | 1 | 13 | 8 | 48 | — | 4 | — | 1 |

remaining 119 cases 75 were treated with sulphonamides and 44 with penicillin. The penicillin cases are the subject of a separate communication (Sorsby and Hoffa, 1945).

As can be seen from Table I, 56 of these 75 cases were treated with sulphamezathine, 14 with sulphanilamide, whilst 4 cases and 1 case were treated with sulphathiazole and sulphadiazine respectively.

Sulphanilamide was soon discarded. Though it proved satisfactory in its therapeutic effects, it was not well tolerated; in 2 cases it had to be discontinued because of cyanosis and dyspnoea and six more babies showed minor toxic symptoms. No such difficulties were met with sulphamezathine or with the 5 cases treated with sulphathiazole or sulphadiazine. The essential point that emerged from this study was that babies tolerate sulphamezathine in full doses in contrast to their intolerance of such doses of sulphapyridine and sulphanilamide.

Combining the present data with those previously published on treatment by full doses of sulphapyridine, sulphamezathine, sulphathiazole and sulphadiazine, comparative data on the efficacy of these five drugs are available. These are shown in Table II. (See also Fig. 1.)

COMPARITIVE EFFICACY OF VARIOUS SULPHONAMIDES IN OPHTHALMIA NEONATORUM

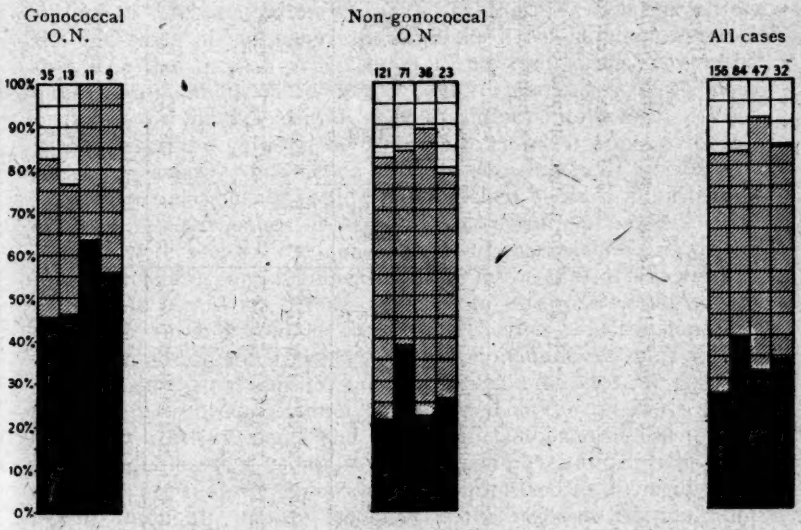


FIG. 1.

The four columns in each block represent cases treated by sulphapyridine, sulphamezathine, sulphathiazole, and sulphadiazine respectively.
Heavy shading = percentage showing clinical cure within 1-3 days.
Light shading = percentage showing clinical cure within 4-8 days.
Numbers over each column = the total number concerned.

TABLE II

*Comparative Results with some Sulphonamides in Ophthalmia Neonatorum*

*333 Cases treated with full doses*

(0·25 g. on admission and 0·125 g. 4-hourly day and night until 48 hours after clinical cure)

| | Sulphapyridine | | | Sulphanilamide | | | Sulphamezathine | | | Sulphathiazole | | | Sulphadiazine | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clinical Cure | Gonococci positive | Gonococci negative | Total | Gonococci positive | Gonococci negative | Total | Gonococci positive | Gonococci negative | Total | Gonococci positive | Gonococci negative | Total | Gonococci positive | Gonococci negative | Total |
| 1—3 days ... | 16 (45·7%) | 26 (21·5%) | 42 (27·0%) | 1 | 6 | 7 (50·0%) | 6 (46·2%) | 27 (38·0%) | 33 (39·3%) | 7 (63·6%) | 8 (22·2%) | 15 (31·9%) | 5 | 6 | 11 (34·4%) |
| 4—8 days ... | 13 (37·1%) | 74 (61·1%) | 87 (55·7%) | — | 3 | 3 (21·4%) | 4 (30.7%) | 33 (46·5%) | 37 (44·0%) | 4 (36·3%) | 24 (66·6%) | 28 (59·6%) | 4 | 12 | 16 (50·0%) |
| 9—30 days; relapses, poor response and intolerance... | 6 (17·1%) | 21 (17·4%) | 27 (17.3%) | — | 4 | 4 (28·6%) | 3 (23·1%) | 11 (15·5%) | 14 (16·7%) | — | 4 (11·1%) | 4 ( 8·5%) | — | 5 | 5 (15·6%) |
| Totals ... | 35 | 121 | 156 | 1 | 13 | 14 | 13 | 71 | 84 | 11 | 36 | 47 | 9 | 23 | 32 |

Several points of interest emerge :—

(1) Accepting a clinical cure within 8 days as a satisfactory result, it is seen that sulphapyridine and sulphamezathine give almost identical percentages of successes, viz., 82·7 per cent. and 83·3 per cent. respectively.

(2) The smaller series treated with sulphathiazole and sulphadiazine give rather better results, whilst sulphanilamide shows a somewhat poorer response.

(3) Sulphamezathine gives a larger percentage of successful results within 3 days than sulphapyridine.

(4) With sulphapyridine, sulphamezathine and sulphathiazole cures within 3 days appear to be obtained more readily for cases of gonococcal ophthalmia than for cases of ophthalmia neonatorum due to other organisms.

For the present the choice of a sulphonamide in the treatment of ophthalmia neonatorum lies therefore between sulphamezathine, sulphathiazole and sulphadiazine. The last—an American product—is not readily obtainable.

## Sulphonamide resistant cases

Table II shows that whatever sulphonamide is used there is a residue of cases that do not do well. Taking the two larger series, the 156 cases of sulphapyridine and the 84 of sulphamezathine, it is seen that in each group about 17 per cent. of cases required either treatment for more than 8 days, or showed relapses, poor response, or (in the case of sulphapyridine) intolerance. What sulphamezathine gains in being more tolerated it appears to lose in having a larger proportion of cases showing poor response.

No clear relationship could be established between clinical type and failure to respond satisfactorily to the sulphonamides. The failures were seen in the non-gonococcal cases as well as in the gonococcal cases, and there was nothing in the clinical appearances to indicate in any particular instance that the case would not do well with sulphonamide treatment. Whether this resistance to sulphonamide treatment centres on sulphonamide-resistant strains of organisms, or is due to some constitutional factor, or perhaps to inadequate dosage cannot be indicated at the present. It is, however, worth stressing that an unsatisfactory response to sulphonamide does not generally mean a complete failure; it is only exceptionally that the condition is not improved to a considerable extent, and only in rare instances is the response so poor that anxiety for the state of the eye and the ultimate outcome is felt.

Actual data on the 15 failures in the present series of 75 cases treated with sulphonamide are :

(1) Seven cases showing poor response. Five of these were treated with sulphamezathine and the causal organisms were gonococcus in 2 cases, staphylococcus aureus in 2 more, and diphtheroids in one. The 2 remaining cases were a case of staphylococcus with Koch-Weeks bacilli treated with sulphanilamide, and a case with non-haemolytic streptococcus treated with sulphathiazole. In these last 2 cases the general condition was not good; the one case suffered from severe bronchitis, and the other developed broncho-pneumonia whilst under treatment. Ultimately these cases cleared up either by the administration of another sulphonamide, or by the local application of penicillin.

(2) Eight relapses. In all but one case sulphamezathine had been employed and the organisms present were: pneumococci and diphtheroids 2 cases each, gonococcus, no organisms, and inclusion bodies one case each. In one case, in which pneumococci were present, sulphanilamide had been used. In all these 8 cases there was nothing in the general condition to explain the relapse, and they all cleared up when a further course of the original sulphonamide was instituted.

### Degree of severity

The present series contained 26 cases in which the condition was mild, 34 in which it was moderate, and 15 severe, the criteria used being the amount and nature of discharge and the swelling of the lids. As can be seen from the subjoined summary table there was no striking difference in the percentage of cases giving a rapid cure in each of these sub-divisions.

| Clinical Cure | Mild | Moderate | Severe |
|---|---|---|---|
| 1-3 days ... ... ... | 13 | 11 | 7 |
| 4-8 days ... ... ... | 9 | 14 | 4 |
| 9-30 days. Relapses, poor response and intolerance | 4 | 9 | 4 |
| | 26 | 34 | 15 |

Whilst no fine conclusions can be drawn it would appear that severe cases respond as well as those showing milder degrees of the infection. The rapid response that some severe cases give to sulphonamide treatment is so striking that the clinical impression was formed that severe cases do better than those less heavily affected. This is not borne out by the actual analysis. It is, however, clear that severe affections do not necessarily mean prolonged treatment.

In this series 22 cases were unilateral, giving a percentage of 29·3 a close approximation to the 30·5 per cent. and 33·0 per cent.

reported in the two previous studies. No tangible difference was observed in the results of treatment of the unilateral cases as contrasted to those in which both eyes were affected.

### Causal organisms

The subjoined table amplifies the data contained in Table I. in giving the details on the bacteriology of the 66 non-gonococcal cases in this series of 75.

| | | |
|---|---|---|
| No organism found in smear or culture ... ... | | 13 |
| Staphylococcus | | |
| Staphylococci ... ... ... | 1 | |
| Staph. aureus ... ... ... | 19 | |
| Staph. albus ... ... ... | 9 | |
| Staph. aureus and diphtheroids... | 4 | |
| Staph. albus and diphtheroids .. | 3 | |
| Staphylococcus and Koch-Weeks bacilli ... ... ... ... | 1 | |
| Staphylococcus and Morax-Axenfeld bacilli ... ... | 1 | |
| Staphylococcus and diphtheroids | 1 | 39 |
| Other coccal organisms | | |
| Pneumococci ... ... ... | 4 | |
| Micrococcus catarrhalis... ... | 1 | |
| Streptoc. viridans ... ... | 1 | |
| Streptoc. haemolyticus ... ... | 1 | |
| Non-haemolytic streptococcus ... | 1 | 8 |
| Bacilli | | |
| Diphtheroids ... ... ... | 5 | |
| Friedlander's ... ... ... | 1 | 6 |
| Gonococcus ... ... ... ... ... | | 9 |
| | | 75 |

As in the previous series staphylococcal infection is the commonest. Gonococcal infection was low in this particular series accounting for only 12·0 per cent. (though in the whole series of 120 cases seen during the year the incidence was higher: 24 out of 120 or 20·0 per cent.).

*Cases showing inclusion bodies.*—The present series contained 7 cases (9·3 per cent.) in which inclusion bodies were found in epithelial scrapings taken from the conjunctiva. In 6 of these cases no organisms could be recovered. In the 7th staphylococcus aureus was present. In 4 cases the mother did not accompany the baby on admission, so that scrapings from the cervix could not be taken. In the remaining 3 such scrapings were negative in two cases, and inclusion bodies were found in the third. The age

of onset of the ophthalmia in the one case in which inclusion bodies were found in both the conjunctiva and cervix was 3 days. In the two cases where the cervical scraping was negative the onset was at 11 days (in the case complicated by the presence of staphylococcus aureus) and 18 days. In the 4 remaining cases the onset was 8, 11, 13, and 23 days after birth. All babies made an uneventful recovery, 3 after 3 days, 2 after 4 days, 1 after 5 days, and 1 after 10 days treatment. These results bear out the observation previously made that cases of inclusion blenorrhoea do well under sulphonamide treatment—the sulphonamide used in these particular cases being sulphamezathine in all but the case complicated by the presence of staphylococcus aureus which was treated with sulphathiazole.

Though inclusion bodies were recovered in only 7 cases in the series of 75 it is likely that they are present in a higher percentage than these figures suggest. In three mothers inclusion bodies were found in epithelial scrapings taken from the cervix though no such bodies could be recovered from the babies' conjunctiva.

These results agree with those previously reported in 27 cases of ophthalmia neonatorum with inclusion bodies (Sorsby, Hoffa and Young, 1944). Of those 27 cases 6 showed clinical cure within 1-3 days, 18 within 4-8 days and the remaining 3 required a longer period.

## Complications

In no case did any local complications arise during the course of treatment. Two babies admitted with slight unilateral corneal ulceration did well and were discharged with clinically clear corneae. As already indicated no general complications from intolerance to sulphamezathine were noted.

## Routine procedure in treatment

On admission a swab of the pus is taken, both for a smear preparation and for culture. The eyes are then irrigated with a bland lotion, such as half normal saline solution at room temperature. Guttae atropinae sulphas 1 per cent. and drops of medicinal paraffin are instilled as a routine measure in all cases, and half a tablet of sulphamezathine (0·25 g.) crushed into powder is given by mouth in a teaspoonful of water or milk. Sulphamezathine administration is continued in doses of 0·125 g. every four hours, day and night, until forty-eight hours after a clinical cure is obtained. Local treatment consists of three-hourly irrigation with saline solution during the first day in cases with profuse discharge; as a rule there is no need for further irrigation on the subsequent

days. After irrigation medicinal paraffin is instilled as a precaution against the sticking together of the lids. Atropine is instilled three times daily in cases with corneal haze or ulceration.

With this treatment swelling of the lids generally subsides within twelve hours after admission; purulent discharge disappears within twenty-four hours, so that a threatening purulent ophthalmia becomes a simple conjunctivitis giving no anxiety. The eyes are either dry or very nearly so within seventy-two hours.

## Summary

1. On the basis of 333 cases of ophthalmia neonatorum treated with a standard dosage of five different sulphonamides it is concluded that the least tolerated drug is sulphanilamide and that sulphapyridine is less well tolerated than sulphamezathine, sulphathiazole or sulphadiazine.

2. In their efficacy against the infection, as distinct from their tolerance by the babies, these five sulphonamides are not strikingly different.

3. With the standard dosage employed in this series some 30-40 per cent. of cases show clinical cure within 3 days. Well over 80 per cent. of the total are cured by the end of 8 days' treatment.

4. Gonococcal ophthalmia neonatorum responds more readily than other varieties of ophthalmia. Cases showing inclusion bodies respond satisfactorily.

5. Initial severity of the affection does not affect the course unfavourably. Many severe cases clear very rapidly.

6. Irrespective of the causal organism some 15 per cent. of cases show a sluggish or poor response.

7. The routine management of cases is described.

Thanks are due to Matron and Sister Condon of White Oak Hospital, and to Dr. E. H. R. Harries and Dr. Robert Swyer of the North Eastern Hospital for their help and co-operation. We are grateful to Dr. E. N. Young for her painstaking bacteriological examinations.

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# THE SUITABILITY OF EXPERIMENTAL CORNEAL LESIONS FOR EVALUATING LOCAL SULPHONAMIDE THERAPY*

BY

W. T. S. COLE, J. L. HAMILTON-PATERSON and ARNOLD SORSBY†

LONDON

THE difficulties in assessing the value of local sulphonamide therapy in infections of the outer eye centre around the absence of satisfactory methods of inducing such infections in experimental animals. Gonococcal ophthalmia which so readily occurs in man cannot be induced in animals, even when highly virulent organisms are used and the animal is first exposed to various debilitating processes. Much the same difficulties arise with the other organisms commonly met in the purulent and muco-purulent conjunctivitides. It is said (Boros, 1940) that if the reticulo-endothelial system is first blocked by solid particles, such as those contained in solutions of Indian ink, infective lesions can readily be produced. Such experimental lesions are, however, unsuitable for pharmacological and therapeutic studies owing to the severe physiological disturbances—sometimes ending in death—that blocking of the reticulo-endothelial system produces. The one consistent experimental infection of the outer eye that can be induced in the intact animal is corneal ulceration produced by inoculation with B.pyocyaneus, but as has been shown elsewhere (Klein and Sorsby, 1943) such lesions are not quite suitable for determining the value of local sulphonamide therapy mainly for the reason that there is considerable doubt as to the value of the sulphonamides in general in B.pyocyaneus infection.

The work recorded here is largely an account of attempts to obtain experimental corneal infections suitable for the study of the value of therapeutic agents in infections of the outer eye. These attempts all failed.

1. *Experiments with pneumococcus.*—Pneumococcus types 3 and 19 are pathogenic to the rabbit, but attempts to induce corneal lesions by direct inoculation into the abraded cornea and by various additional measures were largely negative.

Pneumococcus type 19 (Lister Institute strain). Four procedures were tried out:

(*a*) Direct inoculation to the abraded cornea of 0·1 c.c. suspension 3 x $10^6$ organisms, suitably exalted by passage into mice: No result in the four eyes thus treated.

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(*b*) Direct inoculation 24 hours after producing a burn of the cornea with solid silver nitrate: No result in four eyes thus treated.

(*c*) Direct inoculation as in (*b*) with exposure of cornea by securing the lids with sutures so that the eyes were kept wide open: No result in four eyes.

(*d*) Subconjunctival injection of the suspension at the limbus. Small transitory corneal opacities developed in the two eyes thus treated.

Pneumococcus type 3.

Procedures (*a*) and (*c*) indicated above were carried out in four eyes in both instances with completely negative results.

2. *Experiments with streptococcus haemolyticus.*—Lancefield A Strain was used in the same dosage and concentration as with pneumococcus, and the following procedures were employed.

(*a*) Direct inoculation on to the abraded cornea. One rabbit and three guinea pigs were used with negative results.

(*b*) Inoculation after silver nitrate burn of the cornea: Two of the rabbits used died overnight. In the surviving rabbit there was no corneal infection.

(*c*) Subconjunctival injection in one rabbit produced small transitory corneal opacities.

(*d*) Direct inoculation on to the abraded cornea after preliminary sensitization of three rabbits by means of repeated intraperitoneal injections of the living cultures of the organism. This procedure carried out when sensitization has become established (as shown by skin tests) gave slight injection of the conjunctiva with a small superficial corneal lesion which, however, healed spontaneously.

3. *Experiments with organisms kindly supplied by Dr. J. Robson.*—In view of the negative results obtained by us and the positive results recorded by Robson and Scott with staphylococcus aureus (1943 *a*) and pneumococcus type 19 (1943 *b*) an attempt was made to obtain experimental corneal lesions in the rabbit by following the technique described by these observers and using cultures of the organisms actually employed by them. We are indebted to Dr. J. Robson for his ready help in this matter. The method of inoculation employed is intracorneal injection as described by these authors: 0·1 c.c. of 100 x $10^6$ organisms were used.

(*a*) *Pneumococcus type 19.*—(Robson and Scott strain). Of three rabbits inoculated, one died with broncho-pneumonia and septicaemia (as shown by a positive blood culture). In the two others a spreading corneal opacity which cleared spontaneously developed in the four eyes; in no case was a corneal ulcer formed. The animal that died had some culture injected into the anterior chamber owing to inadvertent perforation of the cornea.

## EXPERIMENTS WITH PNEUMOCOCCUS TYPE 19 (Lister Strain)

| Number and Animal | Type of Inoculation (0·1 c.c. suspension $3\times10^6$ orgs. :—) | Result |
|---|---|---|
| 2 rabbits ... | Abrasion of cornea ... ... ... 4 eyes inoculated ... ... | No effect |
| 4 rabbits ... | Corneal burn with solid silver nitrate (crystals) ... ... ... ... 4 eyes inoculated, 4 control eyes ... ... ... ... | No effect |
| 2 rabbits ... | Corneal burn with solid silver nitrate, eyelids retracted ... ... ... 4 eyes inoculated ... ... | No effect |
| 1 rabbit ... ... | Subconjunctival injection ... ... 2 eyes inoculated ... ... | Small corneal opacities |

## EXPERIMENTS WITH PNEUMOCOCCUS TYPE 3 (Lister Strain)

| Number and Animal | Type of Inoculation (0·1 c.c. suspension $3\times10^6$ orgs. :—) | Result |
|---|---|---|
| 2 rabbits ... | Abrasion of cornea ... ... ... 4 eyes inoculated ... ... | No effect |
| 2 rabbits ... | Burn of cornea with solid silver nitrate, eyelids retracted ... ... 4 eyes inoculated ... ... | No effect |

## EXPERIMENTS WITH HAEMOLYTIC STREPTOCOCCUS—LANCEFIELD A STRAIN

| Number and Animal | Type of Inoculation (0·1 c.c. suspension $3\times10^6$ orgs. :—) | Result |
|---|---|---|
| 1 rabbit ... ... | Abrasion of cornea ... ... ... 2 eyes inoculated ... ... | No effect ... ... |
| 3 guinea pigs ... | Abrasion of cornea ... ... ... 3 eyes inoculated ... ... | No effect ... ... |
| 3 rabbits ... | Burn of cornea with solid silver nitrate 6 eyes inoculated ... ... | 2 rabbits died overnight. Other one—no effect |
| 1 rabbit ... ... | Sub-conjunctival injection ... ... 2 eyes inoculated ... ... | No effect (small corneal opacities) |
| 3 rabbits ... | Abrasion of cornea after sensitization by intraperitoneal injections of living cultures ... ... ... 6 eyes inoculated ... ... | Slight local opacity with slight injection conjunctiva |

| | | | |
|---|---|---|---|
| living cultures ... ... | ... 6 eyes inoculated ... ... | | junctiva |

## EXPERIMENTS WITH J. ROBSON STRAINS

| Number and Animal | Type of Inoculation | (0·1 c.c. $100 \times 10^6$ orgs. :—) | Result |
|---|---|---|---|
| 3 rabbits ... | Intracorneal injection—six eyes ... | Pneumococcus type 19... | One rabbit died with pneumosepticaemia (perforated anterior chamber). The two others spreading corneal opacity—no ulceration |
| 1 rabbit... ... | Intracorneal injection—both eyes ... | Haemolytic streptococcus | Localised opacity ? abscess |
| 1 rabbit... ... | Intracorneal injection—both eyes ... | Staphyloc. aureus ... | Localised opacity healed in 4 days. Small opacity |
| 1 rabbit... ... | Intracorneal injection—both eyes ... | B. pyocyaneus ... ... | Mild reaction 1 eye—other eye clear |

## EXPERIMENTS WITH MECHANICAL MASS

| Number and Animal | Type of Inoculation | Result |
|---|---|---|
| 2 rabbits ... | Intracorneal injection of pneumococcal vaccine 0·1 c.c. ($1000 \times 10^6$ orgs.) | Slight opacity, healed in 4 days |
| 2 rabbits ... | Intracorneal injection of broth 0·1 c.c. ... ... ... ... ... | Slight opacity, healed in 4 days |

(*b*) *Streptococcus haemolyticus.*—A severe localized opacity going on to ulcer formation developed in one rabbit. Spontaneous healing occurred after 4 days.

These results though distinctly more definite than those obtained in our investigations did not seem to us to satisfy the criteria necessary for an experimental lesion suitable for testing a therapeutic agent. Our impression was that the corneal opacity formed was not an infective lesion but essentially a pressure necrosis reaction—a reading that gained some support from the corneal opacities produced in two rabbits by the intracorneal injection of 0·1 c.c. pneumococcal vaccine (1000 x $10^6$ organism), and in two other rabbits by 0·1 c.c. broth. These opacities though milder than those obtained by the living organisms were essentially of the same type and healed well within 4 days.

4. *Repeat experiments with B.pyocyaneus.*—In order to assess the possibility that the conflicting results obtained by Robson and Scott (1942) and Klein and Sorsby (1943) on the efficacy of local sulphonamide therapy in B.pyocyaneus infection of the cornea might be due to the fact that the one set of observers used sulphonamide-prone organisms and the other sulphonamide-resistant strains, cultures of the organisms used by Robson and Scott were obtained by the courtesy of Dr. Robson. These organisms had, however, been in stock for some time and Dr. Robson pointed out that they might no longer be sufficiently virulent. This proved to be the case, and it was therefore impossible to use this particular strain.

Twelve strains of B.pyocyaneus were then tested *in vitro* against sulphonamide. The organisms were cultured on solid media containing varying concentrations (up to 500 mgm./100 ml.) of the drug. No marked variation in the behaviour of the strains could be detected, all—including the strain supplied by Dr. Robson—requiring a concentration of about 350 mgm./100ml. of sulphanilamide to inhibit their growth. In view of these findings further work was considered unnecessary.

## Summary

1. Attempts to produce infective corneal lesions suitable for therapeutic tests in the rabbit by pneumococcus types 3 and 19 by direct inoculation on to the abraded cornea in the intact animal or after damaging the cornea with solid silver nitrate, and with exposure of the cornea by retracting the lids with sutures, all failed. Preliminary sensitization also failed to produce any satisfactory lesion on inoculation with streptococcus haemolyticus.

2. The method of intracorneal inoculation with pneumococcus type 19 and staphylococcus aureus as described by Robson and Scott did not appear to give lesions suitable for therapeutic tests.

3. *In vitro* experiments with B.pyocyaneus to test the possibility that the conflicting results reported by Robson and Scott on the one hand and Klein and Sorsby on the other hand, might be due to varying susceptibility of different strains of the organism to sulphonilamide were negative.

4. It is concluded that there is no valid experimental evidence that local sulphonamide is effective in infections of the outer eye.

We are indebted to Dr. J. Robson for his courteous and ready co-operation.

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# A CASE OF INTERSTITIAL KERATITIS AT AN EARLY AGE*

BY

PETER J. DEVLIN, D.O.M.S.

LIVERPOOL

ALTHOUGH interstitial keratitis is a common condition, the age incidence of the following case seems to make it worth recording. The age preference is for the second half of the first and the second decades of life. Only 6 per cent. of cases occur under 5 years of age (Spicer, 1924), and its appearance as early as in the case described seems to be a rarity.

E. C., a small girl, aged 15 months, was brought to hospital on April 18, 1944, with a history of having had a heavy cold for a period of 6 weeks. During this time the child's eyes had become red and sore, and it had become unable to open them.

On examination, the child was well nourished and developed for its age, though pale. Photophobia and blepharospasm were, at once, obvious. The right eye showed severe circum-corneal injection with characteristic interstitial vascularisation—the Hutchinson "salmon patch." The whole cornea was opaque from oedema and cellular infiltration.

The left eye showed a similar interstitial keratitis of less extent, but associated with visible keratic precipitates. Both pupils were markedly contracted.

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General examination did not reveal any further clinical signs of syphilitic infection, except that the teeth were very poor, and that the child had "snuffles." The maternal Wassermann reaction was positive.

Local and anti-syphilitic treatment were begun, atropine being instilled, and the eyes being cleansed by irrigations every four hours at first, and later, three times daily. The anti-syphilitic treatment was a daily mercurial inunction, and weekly injections of stabilarsan, 0·15 gramme, intramuscularly. The mother has not yet been brought under treatment.

Now, after a period of nearly three months, considerable clearance of the corneae has occurred. The vascularisation has regressed and the circum-corneal injection has disappeared. The right eye shows scarring and a residual central corneal opacity which is diminishing slowly. The left eye is less densely scarred, and the keratic precipitates have completely disappeared. The child is, of course, too young to assess the visual state accurately. I wish to thank Mr. Horace Mather for his kind permission to publish this case.

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SPICER.—*Brit. Jl. Ophthal.*, Monograph Supplement, I, 1924.

## ANNOTATIONS

### Pains in the head and eye

When called to a patient complaining of pain in the eye it is just as well to remember to examine the neighbouring parts of the head, particularly if examination of the eyeball does not disclose any obvious cause for the pain. A case in point occurred a good many years ago, when the writer was asked to see a very old lady who was more or less bed-ridden and was complaining of sharp neuralgic pain in the left eye. She was more than 80 years of age at the time we saw her. The eye was white, there was no foreign body or in-growing lash and the tension was not raised. The old lady wore her hair on the forehead in two little rolls which tracked back from a central parting to the region of the ear. On raising the left hand roll the cause of her trouble came into view. She had a plentiful crop of herpetic vesicles which had been completely invisible until the hair was raised. We suggested to her doctor that it was an early case of herpes zoster. This turned out to be correct and the old lady's feeble state of health did not enable her to withstand the attack. She died a few days afterwards.

**The Glass Bottle—with an evil genie, the glaucoma fiend**

Early in the writer's career he was asked to undertake the holiday work of a friend. Everything went off all right and our only difficulty was that among the drop bottles in the consulting room there was none labelled homatropine and cocaine. Everything else one could possibly want was there, and the home of the eserine bottle was on the top of the travelling clock on the mantelpiece. Not finding any solution of " H. and C," we searched in various receptacles and at last found a supply of tabloid ophthalmic drugs. These we made use of, and when our colleague returned we mentioned casually that we had'nt been able to find the " H. and C. " bottle. " Why, that's it," said our friend, pointing to the top of the clock. We met this statement by showing that the bottle was labelled eserine. It then appeared that our friend had broken his " H. and C." bottle earlier in the year and had used the other ever since. He had forgotten to mention the fact when we took over. At the time this amused us, but had anything untoward happened the results might have been serious. We learnt a lesson we never forgot. Always have your bottles correctly labelled.

# ABSTRACTS

## I.—MISCELLANEOUS

(1) **Allen, J. H. (Iowa).—Inclusion blennorrhoea.** *Amer. Jl. of Ophthal.*, p. 833, August, 1944.

(1) Forty-three cases of inclusion blennorrhoea were observed during the last six years in the course of 9,580 deliveries, thus giving an incidence of 0·37 per cent. in the new born, or an incidence of approximately 10 per cent. of cases of ophthalmia neonatorum.

Symptoms appeared simultaneously in both eyes in 30 cases but in 12 cases one eye was involved first and in one case the infection remained confined to one eye. Three of the infants had secondary bacterial infection; treatment with 0·5 per cent. silver nitrate ointment three times a day eliminated the bacteria but had no effect on the course of the inclusion blennorrhoea.

The incubation period measured from time of birth to the first appearance of symptoms varied between 5 and 15 days with an average of 8 days.

The first sign of the disease was slight purulent discharge at the inner canthus of one or both eyes followed by oedema of the lids, subconjunctival infiltration, papillary hypertrophy and preauricular

adenopathy. Eversion of the lower lid exposed a longitudinally corrugated lower fornix. Then the purulent discharge increased with chemosis before the chronic stage developed, lasting on an average 60 days. Follicles when present are generally located in the lower lid and fornix. The total duration of the disease averaged 7 months. In several of the acute cases application of fluorescein showed a few minute staining areas.

Scrapings of the lower fornical conjunctiva stained with Giemsa showed typical inclusion bodies. The glass slides must be clean; the smears were fixed over night in absolute methyl alcohol and stained for one hour in dilute Giemsa at 37°C. Inclusion bodies were demonstrable on the average for 66 days after onset of the disease.

Occasionally differentiation between inclusion blennorrhoea and trachoma may be necessary. In trachoma, manifestations are most intense in the upper palpebral conjunctiva while infiltrates and neovascularization of normally clear corneal tissue (elementary pannus) appear early. In inclusion blennorrhoea the maximum pathological change is in the lower palpebral conjunctiva while corneal infiltrates and pannus do not occur. The apparent severity of the disease in its acute phase is out of all proportion to its good prognosis.

Cervical scrapings, made from mothers of 29 infants in this series of 43 cases, revealed inclusion bodies in 27.

The transfer of conjunctival scrapings from a case of inclusion blennorrhoea of the new-born to the normal conjunctiva of a six-year-old subject resulted in the development of a condition identical with that described for swimming-bath conjunctivitis or inclusion conjunctivitis of adults; no corneal changes such as occur in trachoma were seen. Such inoculation was carried out in 40 children in all from one eye to another by passaging; in none of the cases did the disease change its character. The disease was proved to be non-bacterial. Experimental proof of the ineffectivity of silver salts in the prevention of inclusion blennorrhoea was obtained.

The earlier work of Thygeson on inclusion blennorrhoea is referred to (*Trans. Amer. Ophthal. Soc.*, Vol. XXXIV, p. 340, 1936).

A. F. MACCALLAN.

(2) **Somerville-Large, L. B. (Dublin).—Dublin's eye hospitals.** *Irish Jl. of Med. Sci.*, September-October, 1944.

(2) **Somerville-Large's** article on the ophthalmic hospitals of Dublin, is of great interest, and fills, what has been till now, a gap in the history of British ophthalmology. In the last century there were seven of these special hospitals in Dublin, "though only one

remained exclusively devoted to diseases of the eye during the whole of its existence." All but one of these hospitals were founded during the first half of the century. They made queer alliances: one was joined with diseases of women and children, one to maternity work, one to skins and a fourth to general medicine and surgery. The alliance between eye and ear has proved durable and still is in being today. The eye hospitals were as follows: The National Eye Hospital (1814-1904); the Charitable Institution (1817-1823); St. Mary's Hospital and Dublin Eye Infirmary (1819-1831); The Ophthalmic Hospital (1829-1834); The Coombe Lying-In Hospital and Dublin Ophthalmic Dispensary (1836-1847); St. Mark's Ophthalmic Hospital for Diseases of the Eye and Ear (1841-1904); Dublin Infirmary for Diseases of the Eye and Ear (1872-1875). At the end of the century plans for amalgamating the National Eye and Ear Infirmary and St. Mark's Ophthalmic Hospital were set afoot and resulted in the formation of the Royal Victoria Eye and Ear Hospital.

Many famous names in Irish ophthalmology and indeed of Irish medicine will be found in this careful history of part of the last century, from Isaac Ryall, Arthur Jacob, Francis White, Hugh Carmichael, Sir William Wilde, A. H. Jacob, Sir Henry Swanzy, J. B. Story, and L. Werner, to that great triumvirate, Graves, Stokes and Crampton.

The preparation of this article must have entailed a great deal of work, for many of the institutions moved their sites frequently, and the author describes those buildings which are still in being. We hope the paper will be widely read; it cannot fail to interest all English speaking ophthalmologists, and we offer hearty congratulations to the author on an admirable piece of work.

R. R. J.

## II.—THERAPEUTICS

(1) **Knight, H. C., Emory, M. and Callahan, N. (New Orleans).—Hyperpyrexia in the treatment of acute ocular inflammations.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 381, 1944.

(1) **Knight, Emory** and **Callahan** discuss the value of hyperpyrexia, as induced by the hypotherm cabinet, in certain inflammatory disorders of the eye such as keratitis, corneal ulceration, herpes zoster, uveitis, retinitis, optic neuritis, panophthalmitis and sympathetic ophthalmitis. They considered the lower level of therapeutic fever as 104° F. Almost all patients were able to endure 5 hours at 105° F. Gonococcal infections required 106-107° F.

Treatments were given at intervals of three to five days. A group of 52 cases were treated. The results are described as excellent in 25 cases and satisfactory in 12. There was immediate relief of pain. Visual restoration was delayed.

H. B. STALLARD.

(2) **Hollander, L. (Pittsburgh) and Krugh, P. T. (East Point, Georgia).—Cancer of the eyelid.** *Amer. Jl. Ophlhal.*, Vol. XXVII, p. 244, 1944.

(2) **Hollander** and **Krugh** found that carcinoma of the eyelids occurs in just over 9 per cent. of skin cancer cases. They report the results of treatment in 125 cases, 17 of these in the upper lid, 47 in the lower, 52 at the inner canthus, and 9 at the outer canthus. Sixty were examined histologically, 45 of these were basal-celled carcinoma, 13 squamous-celled, 1 mixed-celled and 1 a melano-carcinoma. Seventy-nine were men and 46 women and their ages ranged from 25 to 80 years, 82 of these were between 55 and 74.

Thirty-five neoplasms were treated by surgical excision and covering with a pedicle skin graft. Thirty of these were good results and five bad. In 12 cases the excision was done with a radio-knife, in 9 of these the results were good and in 3 unsatisfactory. Electro-desication was done in 13 cases, 7 of these did well and 6 badly. Seventeen cases were treated by the chaoul contact method of X-ray therapy, 12 did well and 5 badly. Twenty-one were treated by superficial X-rays, 14 of these were successful and 7 unsuccessful. Twenty-three patients had a combination of surgery and radiotherapy, in 17 the result was good and in 6 cases it was bad.

H. B. STALLARD.

## BOOK NOTICE

**Manual of Ophthalmology for Medical Officers.** By Lieut.-Col. B. W. RYCROFT, R.A.M.C. 1944.

In the introduction to his "Manual of Ophthalmology for Medical Officers," Lieut.-Col. B. W. Rycroft, R.A.M.C. indicates that the book is for beginners and is intended in particular to emphasise the application of the speciality to service conditions.

One half of the volume is devoted to methods of examination and treatment. Routine procedures are dealt with in a practical manner and the chapter on therapeutic measures should be of value to the nursing as well as the medical profession. It seems doubtful if the

space allotted to details of the technique and application of the slit-lamp, diathermy, and electro-magnet are justified in a work of this scope. A chapter on diseases of the eye follows in which the several structures are considered in the usual manner, though so briefly as to offer only a bare introduction to the subject. The rest of the book consists of a miscellaneous collection of observations on night vision, preventive ophthalmology, simple and gas burns of the eye, sympathetic ophthalmia, and ophthalmology on active service, all of particular interest and value to the serving officer. In this connection it is suprising that fractures of the orbit, so often seen in war casualties and so readily overlooked, receive scant attention.

This work does not deal with ophthalmological problems from the point of view of the established specialist, nor can it be said to offer sufficient basic instruction for the newcomer. Its chief value would seem to be for the ophthalmic surgeon, be he junior or senior, who is about to embark on an Army career, for within these pages will be found a number of useful hints and suggestions from one widely experienced in service ophthalmology.

## CORRESPONDENCE

### FACULTY OF OPHTHALMOLOGY

*To the Editors of* THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIR,—Negotiations which have been proceeding for the past twelve months between the Association of British Ophthalmologists and the Council of British Ophthalmologists for the purpose of fusing together and founding a single Joint Body representing all ophthalmologists in the ophthalmo-political sphere, have finally broken down.

The reasons which underlie this failure are fraught with implications so derogatory to the future welfare of the ophthalmic medical profession and the service it provides for the public as to render it imperative that they be brought to the notice of the profession as a whole in the hope that the publicity may provide the corrective which reason and private discussion have so signally failed to achieve.

It should be explained in the first place that the A.B.O. is an actively functioning, democratically constituted, ophthalmo-political Body which represents approximately half the number of full-time practising ophthalmologists in the country and which is also open

to part-time ophthalmic practitioners of experience. The C.B.O. has quite a different constitution, being composed of some 15/20 senior ophthalmic surgeons mainly in the London area. It is virtually self-elected, and its function in the past has been confined to matters of ophthalmic interest arising in connection with national industries and public services, (*e.g.* working out visual standards, etc.). It has had a purely nominal existence unknown to the mass of ophthalmologists, and has been almost moribund for the past decade at least. The average age of its members must be between 60/65, all in an assured position, and they held aloof from any interest in current ophthalmo-political matters until the A.B.O. passed a Motion at the Annual General Meeting in 1943 to initiate a movement to found a College or Faculty or similar Institute of Ophthalmology.

It would seem that they were then suddenly stimulated into a very active interest. The Council of the A.B.O. welcomed this in the hope that its origin was disinterested but it transpires that their intention was, and remains, to take control of the movement and direct its future course and, in effect, to thoroughly sabotage and delay by hook or by crook a sound and constructive professional development which is deemed long overdue by the vast majority of ophthalmologists.

The facts speak for themselves.

Three Joint Sub-Committee Meetings were held with the object of dissolving the existing organisations and forming a Joint Body to which every man in the country would belong. The first rift was the insistence of the C.B.O. to designate one of its representatives to act as the Chairman of the Joint Sub-Committee and thereafter to confine discussion to a Memorandum it had prepared. Good will and good sense overcame this difficulty. It then transpired that the C.B.O. desired the new Body to assume the title of a Faculty, but it insisted that this Faculty should be unique amongst all other medical Faculties by the exclusion of Fellows. Members and Associate Members were to be permitted. Members alone were to be allowed voting powers. A non-elected senior directorate or "Upper House" was also indicated as being necessary. It was also indicated that the constitution of the Faculty was not to be subject to alteration by any future majority vote of the constituent members.

The Council of the A.B.O. unanimously upheld the decision of its representatives to turn down these one-sided and reactionary proposals. It directed that negotiations must proceed on the following completely democratic lines, *viz* :—

1. It would accept the title Faculty for the new Joint Body but suggested that the separate academic and political functions would

best be subserved by separately elected Councils for each function. Later it gave way on this point.

2. It would accept the title Faculty only if it were to be composed of Fellows, Members, and Associate Members. It finally gave way on this in the interests of professional unity (and with the dissent of many of its Councillors) and accepted the exclusion of Fellows.

3. It insisted that the constitution of the proposed Faculty must be entirely democratic, and that election to the Council of the proposed Faculty must be by vote, and that a majority postal vote of Members must be binding on all matters, and that the proposed Constitution must be subject to alteration annually in the same democratic fashion. It has refused to give way on this point, hence the final failure of negotiations.

An interesting reflection on the mentality which the C.B.O. has shown during these negotiations has been the insistence on depriving consultant ophthalmologists of the right to collectively organise and direct their own affairs, by means of the transparent devices to which I have very briefly directed attention. They quite openly state that they fear "mob rule" within the profession and that a non-elected "Upper House" or "Senate" with authoritarian powers is imperative. There are some five hundred full-time eye men in the country, and should the development of events prove that they are amenable to the set-up the C.B.O. is so ingeniously preparing for them, it will also prove that the C.B.O. assessment of their intellectual level is not wholly unwarranted, however insulting!

Quite a number of ophthalmologists who have been negotiating for the C.B.O. have indicated that they support the principles insisted upon by the A.B.O. but despite this they seem determined to support the new Faculty. The Faculty has been registered by the C.B.O. already, and this step was taken during an interval between negotiations without the knowledge or approval of the A.B.O., and at a time when the A.B.O. had been requested not to take any official steps which might in any way upset the mutually desired successful conclusion of the negotiations! Medical ethics have reached a sorry pass indeed if a responsible group can so "stoop to conquer."

Such being the state of the matter at present, it remains only to indicate that a small group of consultants are prepared to go to any lengths to secure and maintain control of the profession, and as it is crystal clear that this is not in the interest of the profession as a whole, one is left with the assumption that it must be in the interest of this small group. They appear to possess the support of the

Royal College of Surgeons, but it is doubtful if this will be continued when the latter are acquainted with all the revelant facts.

I acted as President of the A.B.O. immediately prior to the commencement of the negotiations referred to and can vouch for the facts I have given. I feel strongly that all such attempts to foist quasi-Corporative Bodies on the profession should be given short shrift, and that the best method is to expose them to the criticism of one's colleagues.

Yours faithfully,

LIONEL M. GREEN.

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*To the Editors of* THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIR,—It is impossible to reply within reasonable limits to all the misleading, and often quite inaccurate statements in Mr. Green's letter.

His allegations with regard to the constitution and activities of The Council of British Ophthalmologists seem to show that he has never troubled to learn how it is constituted nor to acquaint himself with its work. I cannot otherwise account for his extraordinary assertion that it is virtually self-elected. Surely he cannot believe that the Presidents of The Ophthalmological Society of the United Kingdom and of The Section of Ophthalmology of the Royal Society of Medicine and the Master of the Oxford Congress are self-elected; yet it is as holders of those offices that they have become members of the C.B.O. The other members elected annually by the councils of these three bodies, and the one in recent years nominated by the A.B.O., can by no stretch of imagination be described as self-elected. His statement that the C.B.O. has had a purely nominal existence, unknown to the mass of ophthalmologists, implies that the persons constituting the "mass of ophthalmologists" are neither members of the Ophthalmological Society of the United Kingdom nor readers of the British Journal of Ophthalmology. The O.S.U.K. is universally recognised as the leading scientific ophthalmological organisation in the country. It has between 500 and 600 members, and every member has received each year, with the final notice of the Annual Congress, notice of a general meeting open to all ophthalmologists to receive and discuss the annual report of the C.B.O.

These open meetings have been held every year since 1919 except during two early years of the present war. Mr. Green appears to have been unaware of these meetings, which were held at the time of the Annual Congress of the O.S.U.K. to suit the convenience of

the large numbers of ophthalmologists from all parts of the Kingdom attending it.

The annual reports and very many special reports have been published in the British Journal of Ophthalmology. If Mr. Green had heard or read these reports he would have learned that the activities of the C.B.O. have been by no means as restricted as he suggests, and that they have comprised work in the political field of very considerable importance, especially in relation to "optical" benefit under National Health Insurance and in connection with the efforts of sight-testing opticians to obtain statutory recognition.

He is totally mistaken in supposing that the proposal for the foundation of a Faculty was in any way influenced by the passing of a resolution by the Council of the A.B.O., an event of which the great majority of members of the C.B.O. certainly had no knowledge.

Some members of the C.B.O. have long felt that its position would be strengthened if it were reconstituted on a wider and more directly representative basis, and proposals for reform of its constitution were under consideration as early as the summer of 1942.

In March 1943, a memorandum on the subject was presented by one of its members, and a committee was then appointed to consider the question. I was appointed chairman of that committee, which was given power to co-opt any persons whose collaboration it thought would be useful. After preliminary discussions the committee decided that an attempt should be made to draw up a plan for a single comprehensive body representative of all ophthalmologists in the country, and therefore invited the A.B.O. to co-operate by nominating representatives to attend the meetings of the committee. The Ophthalmology Group Committee of the B.M.A. was also approached, and was represented at meetings of the committee by its Chairman. The question of any change in the chairmanship of the committee was never raised, and I entirely fail to understand Mr. Green's reference to a rift on that point.

The original draft plan submitted to the committee as a basis for discussion was very similar to that eventually adopted by the C.B.O. and published in your last issue. There was never any suggestion that Associates should have no voting powers, nor was it ever proposed that there should be "a non-elected senior directorate or Upper House."

Although a considerable measure of agreement was reached on many points negotiations finally broke down because it became apparent that the A.B.O. would not accept a plan ensuring that a majority of the members of the Council of the Faculty should be elected by persons of real consultant status, a condition which the C.B.O. considered of vital importance. The plan for the formation of a Faculty of Ophthalmologists sponsored by the C.B.O. has now

been published, and readers can form their own opinions with regard to many of the charges contained in Mr. Green's letter. One further point, however, calls for a definite answer—his protest concerning the registration of the Faculty "during an interval between negotiations." This action was taken by the C.B.O. at a time when negotiations appeared finally to have broken down and after an overt threat by a representative of the A.B.O. that we should find there would be legal obstacles to the establishment of the Faculty.

Mr. Green does not state whether he is expressing the considered opinions of the Council and Members of the A.B.O. or writing as an individual. I hope the latter, as I feel there must be many members of the A.B.O. who will be willing to co-operate in the establishment of the Faculty as a comprehensive body fully representative of all British ophthalmologists.

Yours faithfully,

W. H. MCMULLEN.

*Chairman of Organising Committee of Faculty of Ophthalmologists.*

## PLASTIC SPHERES

*To the Editors of* THE BRITISH JOURNAL OF OPHTHALMOLOGY.

DEAR SIRS,—The article on plastic spheres by Major R. E. Wright, C.I.E., in the *Brit. Jl. of Ophthal.*, November, 1944, will be read with considerable interest by ophthalmologists of the Central Mediterranean Forces.

Perspex globes of 12-16 mm. have been used by them for Tenon implantation for some months and are now an issue. At first, an R.A.F. Maintenance Unit kindly made them from scrap turret ribs, but now they are manufactured by the ever co-operative R.E.M.E.

So far as I am aware, no undue tissue reactions have occurred and excellent cosmetic results have been seen. Movement up, in, and down is generally good, but limited outwards.

We can thoroughly endorse the points of technique which Major Wright stresses. namely, a neat flat suture line and a reform prosthesis.

It is also found that an implant socket heals more readily than one following an ordinary enucleation, and that an artificial eye is well tolerated a fortnight after operation; this is of importance in military practice.

Delayed implants into recent clean sockets have been made with good results.

The next series of Perspex balls will be made with perforations as Major Wright suggests; at present they have a rough or smooth finish.

We also provide Perspex artificial eyes for awkward sockets, but our experience in this line is not equal to that of the M.E.F. where the practice has been in vogue for some time with very satisfactory results.

Yours faithfully,

B. W. RYCROFT.

*December 27, 1944.*

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## PHLYCTENULAR OPHTHALMIA

*To the Editors of* THE BRITISH JOURNAL OF OPHTHALMOLOGY.

DEAR SIRS,—The discussion taking place on phlyctenular ophthalmia is to those of us who live in Southern Australia very interesting.

If tubercule be the cause as some seem to think, the unhappy increase of tubercule recently in Victoria should be accompanied by an increase of phlyctenular ophthalmia. This condition long since was common. Now it is a rarity. I have not seen or heard of more than an odd case. I regarded it always as a deficiency disease, usually lack of protein. On a good diet it disappeared. Like trachoma in this part of Australia, it is a disappearing disease. Unhappily tubercule has since shown lately an increase, but so far as I can make out phlyctenular ophthalmia has not increased as one would have expected if tubercule was the cause.

I make no suggestion regarding the considerable amount of investigation which is and has been conducted, but simply state the facts as set out. The disappearance of trachoma is likewise a puzzle. It all points to a complex of causes difficult to unravel.

I have consulted many colleagues and the Ophthalmological Society, none of whom have seen any cases. But a physician who deals extensively in tuberculous diseases said he had seen one case in a tuberculous patient. Such are the facts as known to me.

Sincerely yours,

JAMES W. BARKETT.

MELBOURNE,
*November 11, 1944.*

# NOTES

**Death**

As we go to press we learn with much regret of the death of T. Harrison Butler, late of Birmingham. We hope to publish a memoir of him in our April number.

* * * *

**The Royal Eye Hospital: Clinical Society**

A MEETING of the Clinical Society will be held at the Royal Eye Hospital on Friday, April 27, at 5 p.m., when a talk on Nystagmus will be given by Mr. T. E. Cawthorne, F.R.C.S.

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**Ophthalmological Society of Egypt**

The Annual Congress of the Ophthalmological Society of Egypt will take place at the Memorial Ophthalmic Laboratory, Giza, Egypt, on Thursday and Friday, March 15 and 16, 1945, at 9 a.m. The symposium of the Congress will be "proptosis."

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**Corrigendum**

MAJOR W. O. G. TAYLOR writes to point out a slip in his paper on "a gas mask wafer for presbyopia," *Vol. XXVIII, p. 466.* Line 14 from the top of the page, 50 degrees should read 5 degrees.

* * * *

**Sociedade de Oftalmologia e Oto Rinolaringologie do Rio Grande do Sul Brasil. Officers elected, June, 1944**

President, Dr. Luis Assunçao Osorio. Vice-President, Dr. Humberto Lubisco. First Secretary, Dr. Fernandez v. Alves. Second Secretary, Dr. Saul Fontoura. Treasurer, Dr. Cap. Alfredo A. P. Santos. Librarian, Dr. Antonio L. Viana.

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**Special Notice**

WE are asked by the Ministry of Information to state that the fact that goods made of raw materials in short supply owing to war conditions are advertised in this journal should not be taken as an indication that they are necessarily available for export.